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ABSTRACT

This volume serves as an introduction to and a summary report of the project and provides a description of the context, the rationale, and the objectives of the Studies. The first five chapters describe the purposes to be served by the study, the preparations necessary to serve those purposes, the directions taken and the decisions made to accomplish the work, the variables selected as sources for data collection, and the primary vehicle used to present these data. Three of the next seven chapters serve as outline maps descriptive of the personnel, the outputs, and the work requirements found in educational RDD&E. The remaining four data chapters represent detailed maps, three of which describe the data in terms of the outputs selected as the focus of data collection, and one of which deals with special analyses of the data in response to a limited set of specific questions. The final four chapters of the volume discuss the implications of the Oregon Studies data for (1) conceptual and methodological development, (2) training personnel, (3) developing training models, and (4) further exploration and study. Related Documents are EA 004 583-589. (Pages 394 and 396 may reproduce poorly.) (Author/JH)

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THE OREGON STUDIES

RESEARCH
DEVELOPMENT
DIFFUSION
EVALUATION

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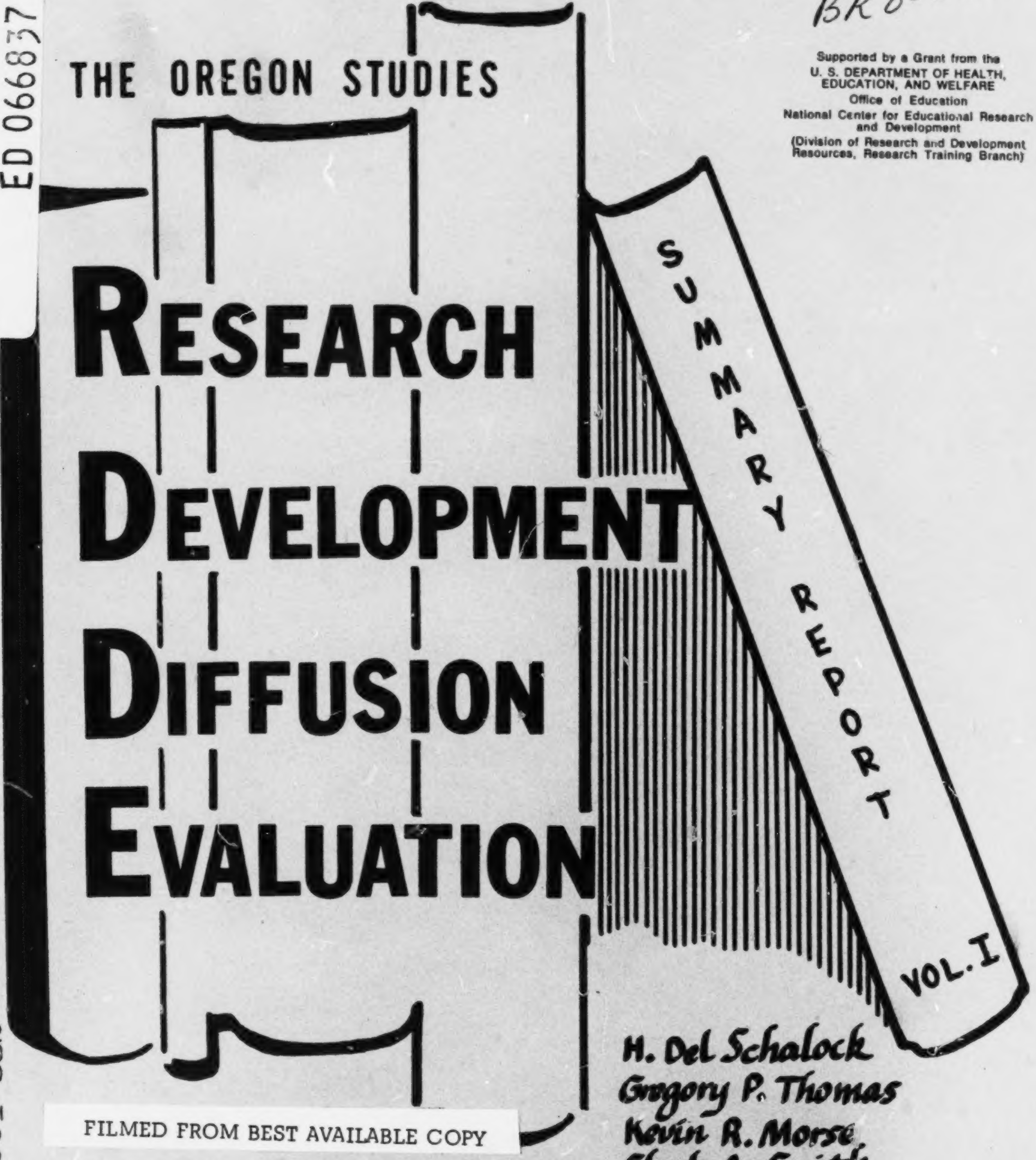

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TEACHING RESEARCH
a division of the Oregon State System of Higher Education

AN OVERVIEW OF THE OREGON STUDIES IN EDUCATIONAL RDD&E

In the spring of 1970 the Training Branch of the U.S. Office of Education, National Center for Educational Research and Development, announced a plan to effect change in the preparation of educational RDD&E personnel. Two factors led to the announcement. The underlying factor was the rather dramatic emergence in the past decade of development, diffusion, and evaluation activities as vehicles for educational improvement, and the attending need for qualified personnel to carry them out. The precipitating factor, however, was evidence that in spite of an investment of approximately 30 million dollars by the Federal Government to help training programs become more responsive to the personnel needs created by these new activities, essentially the same number and kind of personnel were being prepared in 1970 as in 1965.

The plan for change reflected a strategy that can best be described as "beginning at the beginning." It incorporated three interrelated lines of activity: the creation of a conceptual and empirical base on which to build functional training programs; the design of more effective and efficient approaches to training; and the development of instructional materials that reflect desired changes in both content and procedure. The propositions on which the plan rested were straightforward: (a) little was known about educational development, diffusion and evaluation activities, or how they related to educational research; (b) even less was known about the training of personnel to carry out such activities; and (c) until both of these conditions were remedied the likelihood of designing effective and efficient programs to prepare personnel to carry them out was slight. The plan as a whole was coordinated so that the various activities within it would be developed with sensitivity to each other, and so that they would come together in completed fashion at approximately the same point in time. (For additional details on the plan for change see Chapter I in Volume I of the series reporting the Oregon Studies.)

The Oregon Studies, carried out by the Teaching Research Division of the Oregon State System of Higher Education, were to contribute in a beginning way to the conceptual and empirical base called for in the plan. As such they were to produce five products: a collection of detailed "case study" descriptions of projects that illustrated exemplary RDD&E activities within various educational contexts; a reliable, economically feasible methodology by which to collect the data needed to prepare the case studies; a conceptual system or framework for viewing the domain of educational RDD&E that could be used as a guide to the classes of data to be attended to in the case studies; cross-project analyses that highlighted the similarities and differences observed in the projects described, and that tested in rudimentary fashion the adequacy of the conceptual framework underlying those observations; and a compendium of the existing literature that pertained to either the nature of or the interactions between activities labeled educational research, development, diffusion and evaluation. These products are reported in five volumes:

Volume I.	Summary Report (with Technical Appendices)
Volume II.	The Literature of Educational RDD&E Part One (Research, Evaluation, and Development) Part Two (Diffusion & Combinations of RDD&E)
Volume III.	Conceptual Frameworks for Viewing Educational RDD&E
Volume IV.	Profiles of Exemplary Projects in Educational RDD&E Part One (Research and Evaluation) Part Two (Development) Part Three (Diffusion)
Volume V.	A Methodology for the Study of Educational RDD&E

Each volume in the series reporting the Studies has been designed to stand alone, but because each volume reports a different product, and each product can be understood fully only in relation to the other products, two "reader's guides" to the series have been prepared. The first involves brief summaries or abstracts of the contents of each of the five volumes in the series. These appear on the inside of the back cover of the volume, and are intended to serve as a guide or overview to the series as a whole. A more detailed guide is provided by Volume I. In addition to serving as a general summary of the Studies, it contains descriptions of the developmental histories of the products reported in the various volumes, the relationships that exist between them, and the manner in which they have interacted over time. Accordingly, for the reader who wishes to determine quickly what each of the five volumes in the series contains, turn to the inside of the back cover of the volume; for the reader who wishes to understand how the volumes relate to one another, follow that by reading Volume I.

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Final Report

Project No. 0-0701
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A project entitled, "The Generation of Information to Support Long-Term Manpower Studies of and Planning for Training Programs in Educational R, D, D, & E"

(Volume I of five volumes)

THE OREGON STUDIES IN EDUCATIONAL RESEARCH, DEVELOPMENT, DIFFUSION, AND EVALUATION

VOLUME I

SUMMARY REPORT

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ABSTRACT

This is the first of five volumes reporting the results of the Oregon Studies in educational research, development, diffusion and evaluation (educational RDD&E). It contains 16 chapters which a) provide a background to the study in terms of the questions attended to and the variables studied, b) present the data gathered in the study, c) discuss implications of the data and d) set forth a set of recommendations. The first five chapters of the volume contain information descriptive of the purposes to be served by the study, the preparations necessary to serve those purposes, the directions taken and the decisions made to accomplish the work, the variables selected as sources for data collection, and the primary vehicle used to present the data. The next seven chapters of the volume present various aspects of the data. Three data chapters serve as outline maps descriptive of the personnel, the outputs, and the work requirements found in educational RDD&E. The remaining four data chapters represent detailed maps, three of which describe the data in terms of the Outputs selected as the focus of data collection, and one of which deals with special analyses of the data in response to a limited set of specific questions. The final four chapters of the volume discuss the implications of the Oregon Studies data for a) conceptual and methodological development, b) training personnel, c) developing training models, and e) further exploration and study.

PREFACE

The present volume serves as an introduction to and a summary report of the Oregon Studies in educational research, development, diffusion, and evaluation (educational RDD&E). As such it contains a description of the context within which the Studies were undertaken, the rationale for the Studies, and the objectives set for them. It also contains an overview of the methods and procedures used in the Studies, an analysis of the conceptual, methodological and training implications that follow from them, and recommendations for follow-on activities. Most critically, however, the volume reports in summary form the empirical data collected in the Oregon Studies on the nature and purpose of educational RDD&E.

Two volumes in the series of volumes reporting the Oregon Studies contain empirical data. Volume IV contains a collection of "case profiles" that describe 20 ongoing educational RDD&E projects. These 20 profiles represent the primary outputs of the Oregon Studies, and contain all of the empirical data collected during the course of the Studies. The present volume contains a series of "cross project" analyses based on the data reported in the 20 case profiles. These analyses are ordered along a number of dimensions and provide, within the limits of the sample of projects described, data of high utility both for the theoretician and for the practitioner of educational RDD&E.

By adopting a case study approach to the investigation of educational RDD&E activities, a wide range of data had to be collected. These data can be clustered within three broad classifications: general project descriptors; people descriptors; and work requirement descriptors. General project descriptors which appear only in the case profiles, included such items as the objectives set for projects, organizational and management strategies used in projects, resource allocations, the political, intellectual and institutional contexts within which projects rest, and the "dynamics" of project operation. People descriptors, which appear in the profiles and are summarized in Chapters 6 and 12 of the present volume, include such items as educational background and work experience, job roles and related work activities, and resources relied upon in the performance of job related activities. Such data are presented for 134 of the 307 professional staff identified in the 20 projects studied, and were obtained from questionnaires administered as part of an onsite data collection process.

The third broad class of data collected in the Oregon Studies deals with the outputs produced by educational RDD&E projects, and the nature of the work required to produce them. These are the core data generated by the Oregon Studies, and consist of four major data sets: (a) the outputs that emerge from educational RDD&E projects; (b) the standards held for those outputs; (c) the operations (activities, tasks, actions) involved in producing an output to its specified standards; and (d) the enabling knowledges, skills and sensitivities needed to carry out those operations. Such data are presented for 298 of the 962 outputs identified in the 20 projects studied, and were collected through onsite interviews with personnel responsible for the production of the outputs analyzed. All four data sets are reported in the case profile prepared for each project studied. All are also reported in the present volume though in varying ways in different chapters. In Chapters 7 and 8 the four sets of data are ordered and displayed by project focus, i.e., by RDD&E; and in Chapter 9, 10 and 11 they are ordered by class of output. Chapter 12 orders selected aspects of the output - work requirement data by other project characteristics, for example, project size and institutional setting. In combinations, these various analyses, supplemented by a series of technical appendices, provide a reasonably comprehensive picture of that which is produced within educational RDD&E projects, and of the effort involved in its production. All data sets used in the Oregon Studies are described in Chapter 4 of the present volume.

Given the function that Volume I was to play within the series of volumes reporting the Oregon Studies, the utility it was hoped to have for various audiences, and the technical nature of that which was being reported, the form and content of the volume became critical. After considering a number of alternative formats, we chose to model the volume after the reporting form of an exploratory or expeditionary force. We chose this form for a number of reasons: nearly everyone associated with the Studies saw them as being exploratory in nature; everyone saw them as being responsible for describing the process of "mapping the domain" of educational RDD&E; and the reading public is reasonably familiar with the language of such reports, thanks to persons such as Lewis and Clark, Jacques Cousteau, and the flight crews of the Apollo program. Accordingly, the present volume is organized into chapters that deal with such topics as The Mission and the Challenge; Preparations; The Course Charted; Site Maps; Outline Maps; Special Purpose Maps; and Recommendations to the Sponsoring Agency. All are topics that every expeditionary force has to contend with, and they are topics that provide a reasonably good format for reporting the work of the Oregon Studies. It is hoped that the language of exploration, mapping, and the like will prove to be useful to the readers of the volume as it did to those who were responsible for its preparation.

As is the case with nearly any mapping effort, the Oregon Studies expedition was not the first to have entered the territory that was to be mapped, and the maps emerging from the expedition can not be thought of as definitive. Put in other terms, the Oregon Studies expedition did not blaze an original trail within the territory labeled educational RDD&E, and hopefully it will not be the last mapping expedition to be commissioned. It should be seen, rather, as the first major expedition having the explicit charge of systematically mapping the domain of educational RDD&E. As such, it was responsible for pulling together much of the fragmentary information that existed on the territory, weaving that information together with the observations made on the expedition into a systematic whole, and in so doing creating a sound basis on which others might enter or work in the territory for whatever purpose. As with all major exploratory efforts, the expedition built upon the recorded observations of persons who had traveled the territory at an earlier time (the literature reported in Volume II of the series), and those who were most knowledgeable of the territory were asked to prepare detailed charts and preliminary maps as guides to the efforts of the expedition along the way (the conceptual papers reported in Volume III).

The Oregon Studies expedition, as with any other single mapping expedition, suffered two major limitations. Given the time, energy, resources, skills and background information available to the Studies only a limited number of sites could be studied for purposes of map building, and within any site studied, only a limited number of the variables that could be studied were considered. Just as Lewis and Clark could not base their maps upon a detailed exploration of all the rivers, valleys and mountain ranges in the northwest, and the Apollo crews could not base their maps upon a detailed exploration of all major surface areas of the moon, the Oregon Studies were in a position of having to prepare maps of the domain of educational RDD&E on the basis of incomplete data. Even though a great deal of care was taken with respect to the sites selected for study (see Chapter 3), and a great deal of care was taken with respect to the selection of variables to be studied within sites (see Chapter 4), the data base on which maps were to be prepared was limited. The work of the expedition provides the first set of maps that exist for the territory of educational RDD&E as a whole, however, and regardless of how crude or inaccurate they may ultimately turn out to be, that fact alone makes them of value. For those who wish to travel across the territory, work within it, or undertake the task of mapping it further, there now exists at least some good "first approximations" as to what that territory is like.

As all who have administered a large scale R,D,D, or E project know, its successful completion requires the effort and cooperation of a great many persons. Ordinarily the names of such persons would appear in a volume of this kind, for it is altogether fitting that they be recognized publicly. Because of the unusally large number of persons that have contributed to the Oregon Studies, however, and the restrictions in space that accompany the present volume, only a selected few will be recognized here. Full and proper recognition of the persons involved is provided in the prefaces to the volumes that report the Studies in detail.

- Staff and consultants within the National Center for Educational Research and Development, U.S. Office of Education: From the initial conception of the project to its completion Dr. John Egermeir, Dr. Paul Messier and Ms. Cora Beebe of the Office of Education staff, and Dr. John E. Hopkins of Indiana University, played a key role in its planning and implementation. As Director of the Division of Higher Education within NCERD, and as such responsible for the administration of the Training Branch of the U.S. Office of Education, Dr. Messier was immediately responsible for both the initiation and implementation of the program within which the Oregon Studies were initiated.[1]

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[1] Dr. Messier is now directing planning for the proposed National Foundation for Higher Education, and the Training Branch has been renamed the Research Training Branch and moved from the Division of Higher Education to the Division of Research and Development Resources, National Center for Educational Research and Development. Dr. Egermier is now serving as the director of the Research Training Branch, with Dr. Susan S. Klein assuming the task of project officer.

From its earliest planning, however, the program as a whole, as well as the Oregon Studies within it, was the result of a remarkably productive interaction between all four persons identified. Dr. Egermier functioned initially as project officer and coordinator of all three program thrusts, Ms. Beebe served as the staff representative from the Division of Planning and Evaluation, and Dr. Hopkins acted as the substantive specialist and standing consultant to the program. Singly and in combination these four persons have contributed to the form and function of the Studies in countless ways.

- Continuing consultants to the Oregon Studies: In order that a broad range of experience in map building within the behavioral sciences be incorporated within the Studies, three persons from related disciplines were asked to serve as continuing consultants to them. In this regard, Dr. James Watson of the University of Washington represented the point of view of social anthropologists; Dr. Harry L. Ammerman, formerly of the Human Resources Research Organization, represented the point of view of applied psychologists concerned with job and task analysis; and Dr. Samuel A. Sieber of Columbia University represented the point of view of social psychologists. Following Dr. Ammerman's move to the staff of the Oregon Studies, Dr. Norman J. Boyan, formerly Director of the Bureau of Research, U.S. Office of Education and now Dean of the Graduate School of Education, University of California, Santa Barbara, represented the point of view of the applied psychologist.

- Authors and critiquers of conceptual papers: The Oregon Studies were designed so that there would be a close interplay between conceptual and empirical activities at all times. To help in this regard the authors of a series of conceptual papers prepared as part of the Studies, and some of the critiquers of those papers, were present each time that the plans for the empirical thrust of the Studies were reviewed formally. As a consequence, the contributions of these persons to the project were as much in the realm of design and methodology as they were in the realm of conceptualization. Dr. Leslie J. Briggs of Florida State University; Dr. Hendrik D. Gideonse, Dean of the School of Education, University of Cincinnati and formerly head of NCERD's Planning and Evaluation Branch; and Drs. Gene V Glass and Blaine R. Worthen of the Laboratory for Educational Research, University of Colorado, were the authors of the conceptual papers. The critiquers of the individual papers, who attended all of the review conferences, were Dr. Norman J. Boyan of the University of California, Santa Barbara; Dr. Paul D. Hood of the Far West Regional Educational Laboratory; and Dr. Glen Heathers of the Learning Research and Development Center, University of Pittsburgh.

- Directors of projects studied: Obviously, the directors of the 20 projects described in the Oregon Studies played a critical role in the mapping venture, for without their participation no maps would have been prepared. A willingness to submit one's work at the operational level to public scrutiny, a willingness to give up three or more days of prime work time to meet other than job demands, and a willingness to release key staff for as much as a day and a half for other than project activities are matters not to be taken lightly. While an agreement on the part of a project director to take part in the Oregon Studies was accompanied by an assurance of anonymity, and thus the names of the project directors do not appear at any point in the volumes reporting the Studies, the reader needs to be aware that they were in some ways the major benefactors of the Studies.

- Teaching Research staff and adminstration: With the magnitude and diversity of the Oregon Studies, and the short time lines within which they were to be carried out, staff had to be organized into a series of "task forces" or teams. In the present volume only the function and composition of those teams will be noted: the excellence of their work and the pleasure of their company can only be alluded to. The literature review team, coordinated by Ms. Bette Porter, consisted of Ms. Lee Green, Ms. Bernett Samples, Ms. Frances Spigai and Ms. Sherrill L. Whittemore; the conceptual framework team, coordinated by Dr. H. D. Schalock and Mr. G. Roger Sell, consisted essentially of the entire collection staff; the site selection team, coordinated by Dr. Dale Hamreus, consisted of Mr. Steve Anderson, Mr. Darrell Clukey and Dr. James Nord; the site visitation team, coordinated by Dr. H. D. Schalock, consisted of Dr. Ammerman, Dr. Hamreus and Mr. Gregory Thomas; the data collection, reduction and profile preparation team, coordinated by Dr. Ammerman and Mr. Thomas, consisted of Mr. Loring Carl, Mr. Clukey, Mr. Norman Crowhurst, Ms. Green, Mr. Herb Hill, Ms. Diane Jones, Dr. Rod Myers, Dr. Nord, Mr. Dean Pielstick, and Mr. Clark A. Smith; the data analysis, storage and retrieval team, coordinated by Mr. Thomas, consisted of Dr. Ammerman, Mr. Carl, Mr. Clukey, Mr. William Hickok and Mr. Smith; the secretarial and financial assistance team, coordinated alternately by Mr. Larry Horyna and Mr. Thomas, consisted on various occasions of the late Ms. Jeri Jenkins, Ms. Donna Coutts, Ms. Bea Lindahl, Ms. Bernett Samples and Ms. Irene Zimmerman; and the intraagency review team of Drs. James H. Beaird, H. D. Fredericks, C. F. Paulson, and John Williamson.

To all who gave so much of their time, their energy, and their experience, my deepest appreciation.

H.D.S.

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Chapter 1

THE MISSION AND THE CHALLENGE

While exact or subtle meanings may be lacking, most Americans are reasonably familiar with the concepts of research, development, evaluation and diffusion.[1] School children, business men, scientists, educators, and homemakers tend to see research as a set of activities that leads to the extension of knowledge, development as a set of activities that leads to the creation of technology, evaluation as a set of activities that leads to decisions as to the worth or effectiveness of something, and diffusion as a set of activities that leads to the adoption or utilization of that which emerges from research or development or evaluation. As such, most people see RDD&E activities as a set of problem-solving tools that man has applied with a great deal of success in the past and that appear to be critical to the solution of the larger and more difficult problems that he faces in the future.

One has only to point to the recent history of the aircraft and space industry, agriculture, medicine, communications, and the military, and trace the role of RDD&E within them, for some sense of the utility of such activities as problem-solving tools in service of particular ends. A comparable history, however, is difficult to trace in education. Research has still to demonstrate to most American educators its contribution to on-line school operations; systematic development and evaluation activities, while being increasingly embraced as major new support systems for the schools, have still to demonstrate their capacity to make a genuine difference in the effectiveness of schooling; and the planned, systematic diffusion of promising educational practices has yet to be demonstrated on more than an "experimental" basis. While it is possible to point to contributions that RDD&E have made to the practice of education, it is probably fair to say that these activities have not yet proved as useful as problem-solving tools within the context of education as they have within other fields of man's endeavor.

A number of factors have been hypothesized as contributing to this state of affairs, for example, the inappropriateness of education as a context within which to apply the tools of RDD&E, the lack of adequate funding for such activities, the incompetence of those who have attempted to apply them to the problems of education. Two alternative explanations seem preferable: the relatively brief history of RDD&E within the context of education, and the failure thus far for these tools to be adapted to the particular demands of education. As recognized entities, with recognized bodies of literature, educational development, evaluation, and diffusion have existed for little more than a decade (Chase, 1970). Educational research, of course, has had a much longer history, and has accumulated a much larger body of literature, but it, too, has commanded major public support for only the past dozen or so years. Until very recently, educational RDD&E activities have been relatively unknown entities to the vast majority of personnel manning the nation's schools, or, for that matter, personnel manning the colleges, universities, R and D centers, and administrative agencies responsible for the management of such activities. As a consequence, it is only now in a sense that it is reasonable to expect contributions to be forthcoming from educational RDD&E, for it is only now that these activities are beginning to be a functional aspect of the educational enterprise.

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[1] Formal definitions of research, development, diffusion, evaluation and related terms will be found in the GLOSSARY that accompanies the volume. When the terms research, development, diffusion, and evaluation are referred to collectively, the acronym RDD&E is often used.

The extent to which RDD&E activities need to be adapted to meet the demands of the particular contexts within which they are applied, at least if they are to function effectively as problem-solving tools within those contexts, is also only now coming to be realized (Gideonse, 1972; Schalock and Sell, 1972). RDD&E within the context of agriculture are simply not the same set of activities that they are within the context of medicine or the military. Nor are they the same set of activities that they must be within the context of education. Units of analysis differ; sources of variation differ; freedom for control and manipulation differ; the properties of measurement differ; analysis and opportunities for replication differ. While it is probable that RDD&E activities share a good deal in common across all contexts, it is also probable that the demands of specific contexts force upon them a great deal of variability. Thus far, such "education specific" adaptations of RDD&E activities have only begun to be made.

The Studies reported in the present volume are based upon the belief that the activities labeled research, development, diffusion and evaluation have as much to contribute to the development and well being of education as they have had to the development of medicine, agriculture, and the like, but for their promise to be realized they must be better understood, more fully developed, and better adapted to the particular needs of education than they are at present. In this regard a host of fundamental issues need to be resolved: How are research, development, evaluation, and diffusion to be conceptualized so as to make them optimally functional within education as a coordinated set of problem-solving tools? What are the best contexts or organizational structures or institutional arrangements within which to apply these tools? What problems are most likely to yield to solution through their application? What are the personnel and other resources needed to carry through on their application? Once such basic issues have been resolved it seems reasonable to assume that RDD&E will be able to contribute to the solution of educational problems as significantly as they have to the solution of other long standing problems.

Such is the hope for educational RDD&E. The distance between hope and achievement, however, is great, and given the relatively primitive state of the adaptation of RDD&E activities to the needs of education, that distance is not likely to be travelled quickly. The Oregon Studies in educational RDD&E were designed to both shorten and facilitate the journey that remains.

The Context Within Which the Oregon Studies Were Undertaken

In 1960, with the passage of the National Defense Education Act, large-scale funds became available for the first time in the United States for the support of educational research and development activities. Through these funds the National Science Foundation sponsored the curriculum development projects of the late 1950's and early 1960's, and the Bureau of Research, U. S. Office of Education, launched a many-sided research program. In 1964, with the passage of the Elementary and Secondary Education Act, educational research and development activities received additional support, and large-scale monies became available for the first time for the support of education evaluation and diffusion activities. With the passage of the Elementary/Secondary Act, funds administered by the U. S. Office of Education in support of RDD&E activities jumped from approximately 10 million dollars per year between 1960 and 1965 to approximately 100 million dollars per year since 1965, and the networks of Regional Education Laboratories, Research and Development Centers, and ERIC Clearinghouses were established.

A parallel but relatively unnoticed growth of educational RDD&E activities has taken place within this same period at the local and state levels, and within the private sector. While information is not available as to the dollar allocations that have accompanied such development, it is clear from the appearance of research, development, evaluation, and diffusion "divisions" within public school systems, state departments of education, and the education industry that the magnitude of growth at this level approaches or perhaps even surpasses that fostered at the federal level.

Thus, in the course of approximately ten years (1960 to 1970), educational RDD&E developed from an essentially unknown entity to what was rapidly becoming recognized as a major component in the overall education system. As with any rapidly growing organism or institution, however, the course of its development had not been smooth and a host of problems remained to be solved. Critics were able to point to mistakes, poor starts, the frequent shifting of positions, and the downright confusion that often characterized its early years. Fortunately, supporters were able to point to some successes, and by the end of the first decade of its existence educational RDD&E had emerged in a reasonably healthy condition (for an excellent account of the growth of educational RDD&E activities within the United States, see Gideonse, 1969).[2]

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[2] It is interesting to speculate as to how such growth was able to come about at a time when educational RDD&E was (cont'd next page)

In the vernacular of the day, it was not possible for the personnel of educational RDD&E to get it all together: the field was still unable to produce either the kind or the quantity of products expected from it. As a consequence the sceptics and critics, and even the long time supporters of educational RDD&E, were growing ever more disenchanted. They wanted more than promises, rosy pictures of the future, models, and pilot demonstrations. They wanted concrete products that made a demonstrable difference in the lives of children and youth. Like all healthy adolescents, educational RDD&E at the turn of the decade was in a position of having to demonstrate its mettle or take its lumps. It was in a position of having soon to take its place as a fully functioning member of a society, and contribute accordingly, or be shunted aside as another misfit.

Such was the general context within which the Oregon Studies rested. The specific context was a multi-sided program that was designed to effect change in the preparation of personnel to function within the educational RDD&E community. The program for change was enunciated by the U. S. Office of Education in the spring of 1970 in response to two aspects of the general circumstance surrounding educational RDD&E: (a) the dramatic emergence of development, diffusion, and evaluation activities, as accompaniments to research, as vehicles for educational improvement; and (b) the lack of a sensitive response on the part of most training programs to the personnel needs that accompanied the emergence of these activities. The latter was interpreted as being the

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[2] (Cont'd) able to contribute so little to the on-line practice of education. While a systematic analysis of the factors accounting for its growth has not been made, it seems reasonable to assume the interaction of four relatively persuasive conditions: (a) the perception that the problems facing American education were critical; (b) the relatively strong faith, based on success in other of man's endeavors, that the tools of RDD&E would be able to be applied successfully to the solution of a great many of those problems; (c) the promising nature of some of the products that were emerging from the application of these tools, for example, individualized and performance-based curricula, computer-based scheduling systems, management information systems; and (d) the recognition that a reasonable period of time must pass and a reasonable investment of resources must be made in order to develop the support systems needed for the implementation of large-scale RDD&E efforts. Such support systems include institutions designed to execute RDD&E functions, a bureaucracy that can manage and administer such functions, and a cadre of reasonably seasoned personnel to execute them. In a sense, the supporters of educational RDD&E found themselves in the same circumstance that investors in any new product or institution often find themselves: the need for and promise of a new product are so great that an initial investment in its future seems critical, but once investment begins it has to be maintained until the total investment starts to pay off -- simply to protect the initial investment. The rationale and political consequences of doing less in the case of educational RDD&E made other than continued support essentially impossible.

case when, after a U. S. Office of Education investment of approximately 30 million dollars, educational RDD&E training programs in the spring of 1970 were found to be preparing nation-wide roughly the same number and kind of personnel as they were in 1965. With the personnel needs that existed at that time, the projected needs of the future, and the apparent resistance on the part of most training programs to change, the situation was ripe for overhaul.

In response to these circumstances Dr. Paul Messier, then Director of the Division of Higher Education within the National Center for Educational Research and Development (NCERD), U. S. Office of Education, and as such responsible for the programs of the Training Branch of the U. S. Office of Education, launched a three-dimensional plan for change. The first dimension involved the creation of a conceptual and empirical base on which to build new training programs. The rationale for establishing such a base was straightforward: (a) to be effective training programs have to have a clear notion of what it is they are to prepare people to do, and (b) at that point in time a clear notion of what people actually do in the conduct of development, diffusion, and evaluation activities, or the knowledges, sensitivities, and skills needed to do them, did not exist.

The second dimension of the plan involved the creation and implementation of totally new approaches to training. Again, the rationale for such a move was straightforward: (a) there were few if any programs in existence that were designed explicitly to prepare persons to function within the emerging fields of educational development, evaluation, and diffusion; (b) the design of such training programs was seen as a major undertaking; and (c) the training models used to prepare educational R & D personnel in the past were open to improvement.

The third dimension of the plan called for the creation of instructional materials that would reflect the desired changes in training, both in terms of procedure and content. Since the exact nature of these materials had to await the completion of the other two dimensions of the plan, the materials development effort was treated essentially as a pilot or experimental venture during its first year of operation.

Broadly conceived, then, the strategy of the U. S. Office of Education's plan for change was to take steps simultaneously to develop substantive input for new kinds of training programs, establish new designs for training programs, and create instructional materials or "systems" that would effectively deliver the substantive information that the new programs were designed to handle. The plan as a whole was coordinated so that all three lines of activity would interact during the course of their development, and would come together in completed fashion at approximately the same point in time.

The Oregon Studies were designed to fulfill the intent of the first dimension of the plan. As such it was to provide (a) an "empirical map" of the domain of educational RDD&E, as currently practiced in projects regarded to be of high quality and reflective of directions which educational RDD&E are likely to take in the future; (b) a conceptual framework that would provide both guidance to that which was to be mapped, and a language for describing it; and (c) a generalizable "case study" methodology for use in the Oregon Studies and subsequent mapping efforts. The initial map was to be based upon the detailed analysis of 20 projects that crosscut the domain of educational RDD&E, with the analysis of each to include

- the identification of the critical outputs of work effort.
- a description of the characteristics of each output.
- a description of the interdependencies of outputs.
- the standards applied by project personnel to each output.
- the production operations performed by project personnel to generate each output.
- the policy and management operations associated with the generation of each output.
- the enabling knowledges, skills, and sensitivities reported by project personnel as essential to the generation of each output.
- types of personnel associated with the generation of each output, the . background of training, and other characteristics.
- a description of the characteristics, contexts, and dynamics of each project as a whole.

In addition, the Oregon Studies were to prepare a compendium of the existing literature dealing with the nature of and interrelationships between educational RDD&E, both as a foundation on which to develop the other aspects of the project and as a document of general worth and interest in its own right.

The second dimension of the plan involved contracting for the competitive design of alternative experimental training programs. Twelve grants were let for this purpose in June of 1970, and the designs were completed and submitted for review by December of the same year. Of the designs submitted, three were selected for implementation on an experimental basis: one at the Far West Laboratory for Educational Research and Development under the direction of Dr. Paul D. Hood; one at the Ohio State University under the direction of Dr. Daniel Stufflebeam; and one at the Pittsburg Center for Learning Research and Development under the direction of Dr. Glen Heathers.

The third dimension of the plan involved the letting of a number of contracts for the development of specific instructional materials, but as indicated previously this activity was largely exploratory in nature during its first year of operation. With the completion of the other two dimensions of the plan it was anticipated that the development of instructional materials would proceed on a much larger scale.

Two other projects need to be mentioned as part of the overall context within which the Oregon Studies rested: (*a*) the first AERA-sponsored study of educational R & D manpower, completed shortly after the Oregon Studies were undertaken (Worthen & Byers, 1970); and (*b*) the second AERA-sponsored study, which paralleled in time and function critical aspects of the Oregon Studies (Worthen, et al., 1971). Reasonably close contact was maintained with the staff of the second AERA study throughout the conduct of the Oregon Studies.

The Initial Conception of the Studies

As funded the Studies had six stated objectives:

1. Develop one or more conceptual frameworks which define, differentiate, and relate the processes of educational research, development, diffusion and evaluation.

2. Provide a description of the competencies needed by staff to carry out the operations involved in a selected sample of representative RDD&E projects, classes of indicators acceptable as evidence of such competencies, and the knowledges, skills and sensitivities prerequisite to their demonstration.

3. Provide information on staffing patterns currently in use in the selected sample of educational RDD&E projects studied in (2).

4. Provide recommendations as to ideal staffing patterns for the projects studied.

5. Provide recommendations as to priorities for competency development within existing and projected staffing patterns, and

6. Prepare a compendium of currently available papers, both within and without education, that describe a) the *processes* involved in educational RDD&E activities, and b) the *conceptual frameworks* that have been used to differentiate and/or relate them.

Operationally, these were translated into four products that were expected to emerge from the project:

1. A compendium of available documents that a) conceptualize the nature of and the relationships between educational RDD&E activities, and b) describe the processes involved in carrying out those activities.

2. At least three carefully prepared and critiqued frameworks which synthesize the existing literature relative to educational RDD&E activities, and two written critiques of each framework.

3. A refined, field tested case study methodology that could be used in the analysis of educational RDD&E activities within ongoing projects.

4. A first break-out of the competencies needed to carry out RDD&E activities, the classes of indicators acceptable as evidence of their possession, staffing patterns being used to carry out RDD&E activities, priorities that should be given competency development within alternative staffing patterns, etc.

So conceived the Oregon Studies were seen as serving three distinct though not independent purposes: the purpose of science, the purpose of training and the purpose of policy making. In their function as a scientific effort the Studies were to provide an initial mapping of the field of educational research, development, diffusion, and evaluation (much as any basic scientific effort attempts to establish an initial map of the domain with which it is to deal), a methodology by which to carry out such mapping, and a conceptual framework that would give meaning to that which was mapped by placing it in an interpretive context. In their contribution to training the Studies were expected to provide conceptual clarity and data that would be of value to the design and operation of personnel development programs that support educational RDD&E. The contribution of the Studies to policy setting was never particularly clear, but there was an explicit assumption that the data that emerged from the Studies would be of value to policy makers in reaching decisions about the kinds of educational RDD&E activities to be funded and the support of training programs pertaining thereto.

Procedurally, the Oregon Studies were divided into two phases. PHASE I (May 15, 1970 to October 30, 1970) called for the completion of the compendium of available literature, second draft copies of the conceptual framework papers and an advanced version of the case study methodology. The major activities pursued within Phase I, and their relationship to one another over time, are summarized schematically in Figure 1.

Building upon the work of Phase I the empirical thrust of the Studies was to occur in PHASE II (November 1, 1970 to August 30, 1971). During that period an intensive study of 20 or so exemplary projects, varying in focus, the setting in which they were being conducted, and size, was to be carried out. The conceptual framework papers were also to be completed and critiqued. These activities and their interrelationships are summarized schematically in Figure 2.

The Evolution of the Studies

During the course of the Oregon Studies four major refinements occurred that significantly influenced the nature of the products that emerged from them: (a) the evolution of the basic science function of the Studies as their primary focus; (b) an accompanying emphasis upon

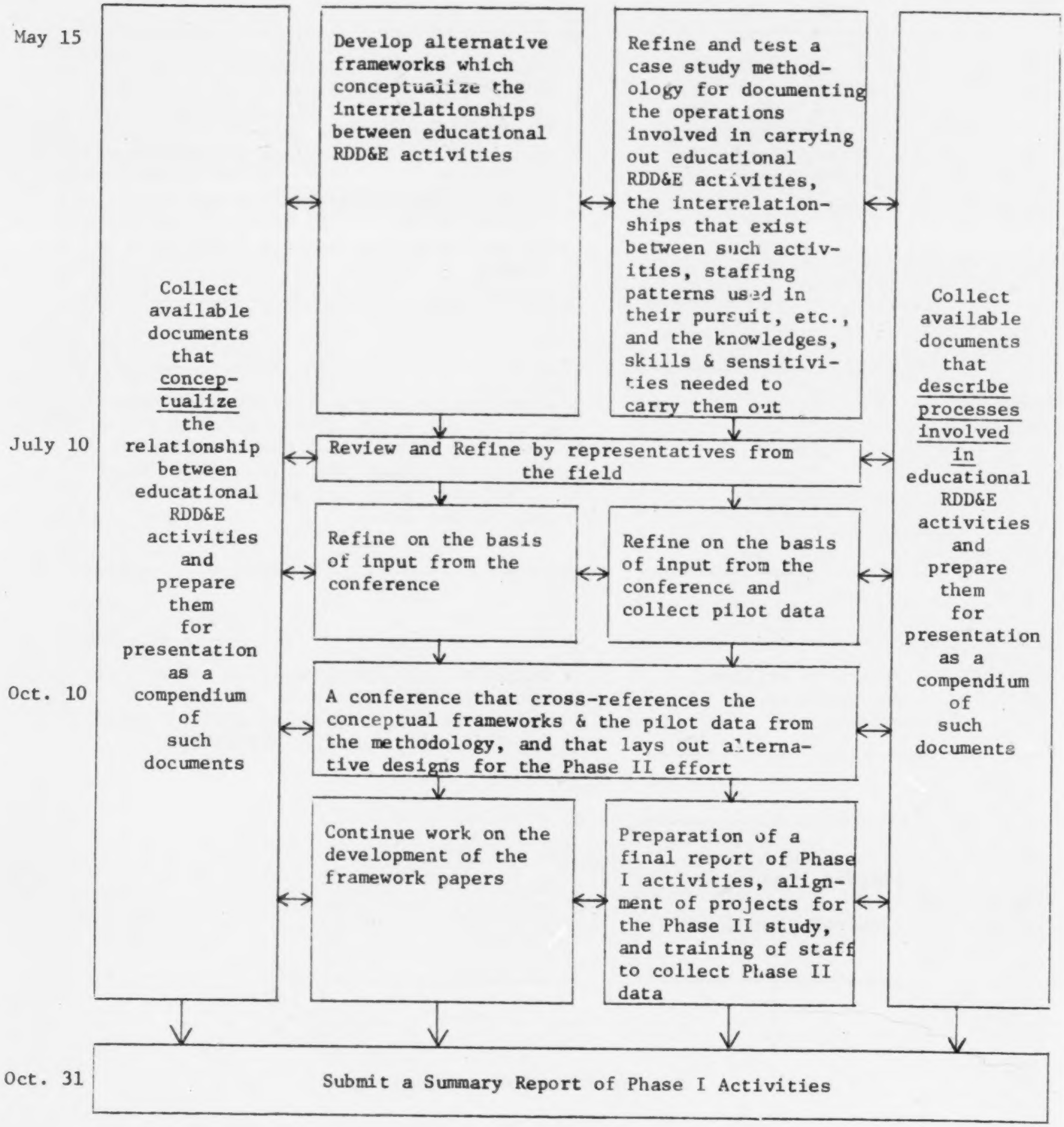
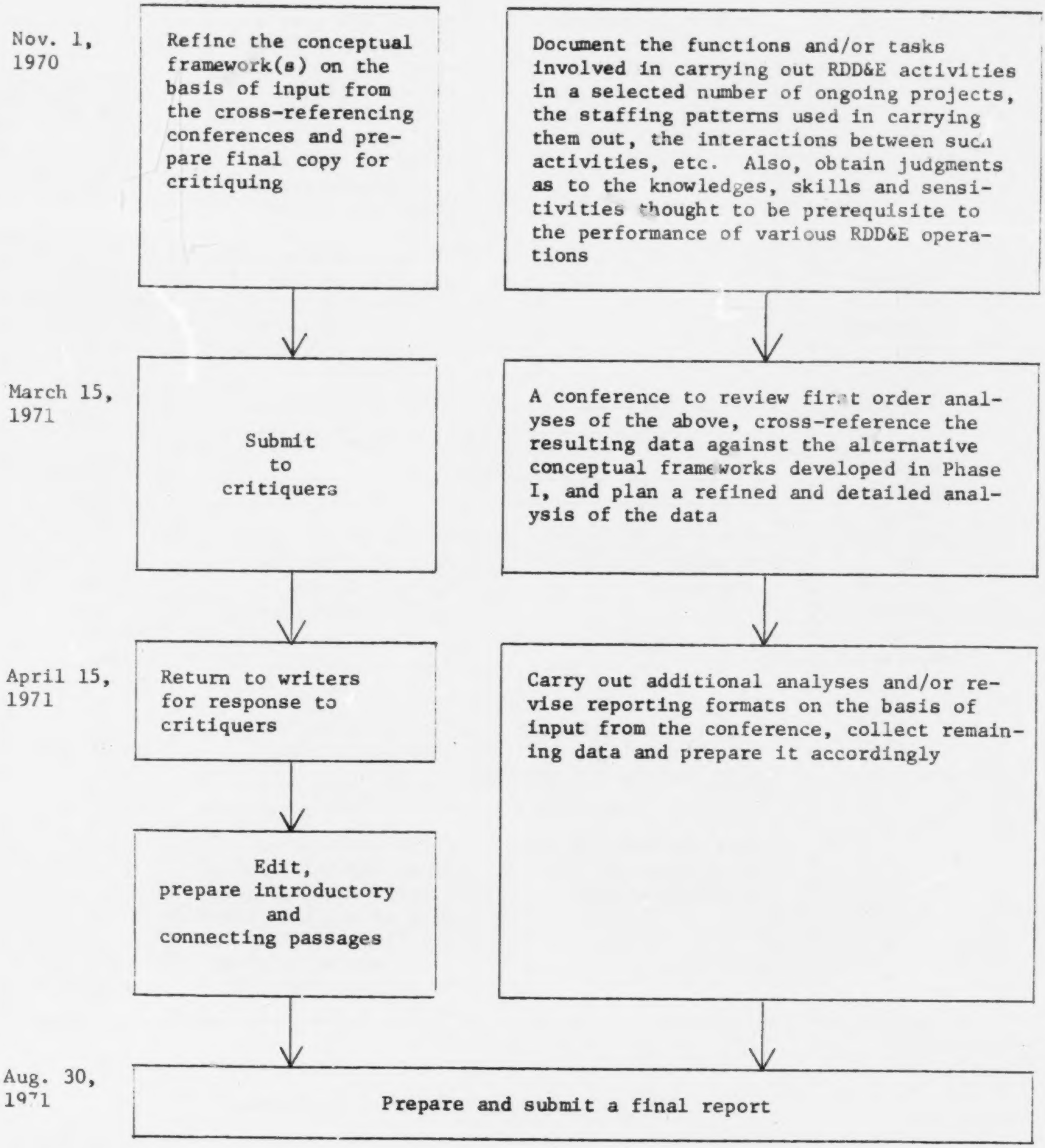

May 15
July 10
Oct. 10
Oct. 31
Collect available documents that conceptualize the relationship between educational RDD&E activities and prepare them for presentation as a compendium of such documents
Develop alternative frameworks which conceptualize the interrelationships between educational RDD&E activities
Refine and test a case study methodology for documenting the operations involved in carrying out educational RDD&E activities, the interrelationships that exist between such activities, staffing patterns used in their pursuit, etc., and the knowledges, skills & sensitivities needed to carry them out
Collect available documents that describe processes involved in educational RDD&E activities and prepare them for presentation as a compendium of such documents
Review and Refine by representatives from the field
Refine on the basis of input from the conference
Refine on the basis of input from the conference and collect pilot data
A conference that cross-references the conceptual frameworks & the pilot data from the methodology, and that lays out alternative designs for the Phase II effort
Continue work on the development of the framework papers
Preparation of a final report of Phase I activities, alignment of projects for the Phase II study, and training of staff to collect Phase II data
Submit a Summary Report of Phase I Activities

Figure 1.1. The major activities carried out in Phase I of the Oregon Studies.



Nov. 1, 1970

Refine the conceptual framework(s) on the basis of input from the cross-referencing conferences and prepare final copy for critiquing

Document the functions and/or tasks involved in carrying out RDD&E activities in a selected number of ongoing projects, the staffing patterns used in carrying them out, the interactions between such activities, etc. Also, obtain judgments as to the knowledges, skills and sensitivities thought to be prerequisite to the performance of various RDD&E operations

March 15, 1971

Submit to critiquers

A conference to review first order analyses of the above, cross-reference the resulting data against the alternative conceptual frameworks developed in Phase I, and plan a refined and detailed analysis of the data

April 15, 1971

Return to writers for response to critiquers

Carry out additional analyses and/or revise reporting formats on the basis of input from the conference, collect remaining data and prepare it accordingly

Edit, prepare introductory and connecting passages

Aug. 30, 1971

Prepare and submit a final report

Figure 1.2. The major activities carried out in Phase II of the Oregon Studies.

the development of an exhaustive and generalizable "case study" methodology; (c) the decision to use the outputs of work effort instead of job roles as a basis for analyzing work and its prerequisites within projects; and (d) a shift from the notion of a preferred conceptual framework emerging from a synthesis of the four conceptual papers prepared for the Studies to the notion of four independent papers, with the paper prepared by the staff of the Studies reflecting the empirical-conceptual thrust of the Studies. Because of their centrality, each of these refinements is described briefly in the paragrapns that follow.

Sharpening the Focus of the Studies

As indicated previously the Oregon Studies were viewed at their outset as serving three functions, that of science (the extension of knowledge), that of training, and that of policy making. In the early stages of the Studies an effort was made to attend equally to all three functions when making decisions that affected literature review, conceptual development and/or data collection methodology. It soon became apparent, however, that the complexity that this introduced to the decision-making process was so great that it could not be handled with the time and resources available. As a consequence, after three or so months, the advisory body to the Studies recommended that the first responsibility of the Studies be to science, and that the integrity of the conceptual framework guiding the Studies, the methodology being developed, and the data to be collected not be threatened by training or policy considerations. This did not mean that the Studies abdicated their responsibility to training and policy, or that the discussion of such matters ceased, but it did mean from that point on that training and policy considerations did not dominate design decisions.

The Development of a Case Study Methodology

From its earliest conception the Oregon Studies were seen as providing evidence as to

> "the functions, tasks and operations involved in carrying out educational R, D, D & E activities, the interrelationships that exist between such activities, staffing patterns used in their pursuit, indicators acceptable as evidence of ability to carry out given operations within given staffing patterns, judgment as to the knowledges, skills and sensitivities needed to perform the various operations within a given staffing pattern, etc." (from page 10 of the proposal for the Studies).

In its early drafts the proposal called for a job or task analysis methodology to get at such data, with projects like the Sesame Street television series, the Philadelphia Advancement School project, the IPI Mathematics Program developed by Research for Better Schools and the Harvard computer-based information system for vocational decision-making proposed as the context within which to apply it. The rationale for proposing such a methodology was relatively straightforward: (a) it was a well-established methodology, and one that was seemingly appropriate to the focus of the project; and (b) members of the faculty of

Teaching Research were familiar with it. The rationale for proposing the documentation of RDD&E activities within large project sites was also relatively straightforward: (a) they were sufficiently complex that they would provide a variety of RDD&E activities for description within each project; (b) they represented instances of research, development, evaluation, and diffusion that were prototypic to such activities in the future.

In the course of proposal review USOE staff and their consultants recommended that the methodology move beyond that which is ordinarily encompassed in a job or task analysis and assume the focus of a "case study" methodology.[3] In light of the kind of information being sought, and the kind of projects within which information was to be sought, this seemed to be an appropriate recommendation--even though it was not accompanied by a clear-cut specification as to what such a methodology might look like operationally. Two additional recommendations were made relative to methodological development during the course of the Studies:

1. Throughout the life of the project developmental and evaluative efforts needed to be directed to the methodology per se; and
2. For purposes of cross-site analyses data that were comparable across sites had to be tracked and treated separately and the data peculiar to each site, as a consequence of evolution in methodology, had to be tracked and treated separately.

The Development of Output Analyses

At the time that the case study approach to data collection was adopted it was still assumed that the central focus of the data within a case analysis would be the jobs or roles performed by project personnel. As the project began to interface with real-world RDD&E, however, it was soon found that job definitions were relatively unstable. Jobs seemed to be defined differently by different organizations, and within a single organization differently for different projects. It was also common for jobs to change in definition several times within the life of a single project. As a consequence, jobs seemed to serve poorly as the basic unit for work analysis.

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[3] As used in the Oregon Studies a "case study" was to result in a "case profile" of an ongoing RDD&E project. Such a profile was to provide an exhaustive description of a project and its operations over a specified period of time. As such the "case study" methodology assumed a form that was somewhat different than the classical use of such a methodology. Chapters 4 and 5 of the present volume describe the data collected by the methodology, and the way in which it is organized in case profile format, respectively.

Faced with this fact an alternative to job definition was sought as a focus for data collection and analysis. Outputs of projects emerged as a viable alternative since they represent relatively stable entities within the life of a project, and they probably represent the largest single source of variation in project operations.[4]

Outputs also held promise as relatively stable units for cross-project analyses when RDD&E activities were defined in terms of their outputs (see the GLOSSARY for illustrative output definitions, and the conceptual paper by Schalock and Sell in Volume III of the series reporting the Oregon Studies for operational definitions of research, development, diffusion and evaluation in output terms). The centrality of the output focus to the data collection effort in the Studies is evident in the listing of the major categories of data collected in Chapter 4, Figure 4.1.

A Shift from a Preferred to a Data Dependent Conceptual Framework

To insure as strong a conceptual base to the Studies as possible, a series of conceptual papers were prepared for use in the Studies. Three of these were commissioned from well-known persons in the field, and one was prepared by the staff of the Studies. The aim of each paper was to "....define, differentiate, and relate educational RDD&E activities, and provide a rationale for the particular point of view taken in doing so." As such, each paper was to represent a synthesis and/or extension of earlier conceptual efforts within the field.

Initially it was planned that a "preferred" framework emerge from some combination of the four papers, and function as the conceptual base to the empirical-methodological thrust of the Studies. Two factors made such a plan unworkable: the magnitude of the differences in points of view reflected in the conceptual papers and the press of time on methodological development. Upon review of the first drafts of the papers it was clear that a preferred framework could never be fashioned from the four frameworks proposed in time for it to function in a useful way in the shaping of methodology. As a consequence the authors of the papers were freed of the expectation that a compromise between papers be found, and were encouraged to expand the initial drafts of their papers as they saw fit in light of the reviews given them by independent critiquers.

In order to meet the responsibility assumed by the Studies for at least one of the conceptual papers to be data dependent, that is, to be fashioned against and consistent in final form with the framework used for purposes of data collection, the paper prepared by the project staff was referenced at all points in its development against data derived through empirical observation. The strategy followed in preparing the paper was one of arriving at a particular level of clarification in regard to both the conceptual framework and the methodology, applying the methodology to the analysis of two or three ongoing projects, refine both the conceptual framework and the methodology on the basis of those data, reapply the methodology, etc. The rationale for insisting that the conceptual framework guiding the empirical thrust of the Studies be one that was itself tested empirically involved three interdependent assumptions:

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[4] The premise on which this statement rests is the simple notion that "what needs to be produced" in large part determines what needs to be done to produce it.

1. The data that derive from a study are as good only as the concepts that mark the boundaries of that which has been investigated.
2. The "goodness" of concepts is a matter that must be demonstrated empirically, that is, a "good" concept is one that permits operational definition, functions as a significant source of variance, etc.; and
3. In its present state of development the domain of educational RDD&E does not possess a conceptual structure that meets such criteria.

The aim of the conceptual paper prepared by the Oregon Studies staff was to provide a first approximation to such a structure.

The Challenge Perceived

As in any major exploratory effort it was necessary in the Oregon Studies to meet not only the day-to-day challenges encountered, for example, obtaining the cooperation of participating projects and maintaining the health, working effectiveness, and morale of staff, but to insure that the technical, logistical, and material support needed for the overall success of the project were available as well. Toward this end a major source of challenge within the project became the clarification of the parameters of the territory to be charted, the selection of the variables within it to be attended to in the mapping process, the development of the instruments needed to collect trustworthy information, the preparation of a detailed schedule and logistical plan for the expedition that blended optimally the objectives of the mission with the time and resources available to it, and the preparation of personnel to perform reliably the functions required on the expedition.

In addition, however, there was also the challenge of striking an appropriate balance between the basic science, the immediate utilitarian and the long-term policy functions of the mission -- a challenge that explorers like Lewis and Clark, Jacques Cousteau, and the men of the Apollo space program have also had to face. In the sponsorship of almost any exploratory effort these contending forces have to be dealt with for they represent the collective interests that make such explorations possible in the first place. The manner in which the balance was struck in the Oregon Studies has already been described; whether it will prove to be the most productive balance remains to be seen.

Finally, there was the challenge of fitting the Studies within the perspective of the long-term needs of the field of educational RDD&E. Sense had to be made of what the field was about, where it was going, and what needed to be done to get it there -- and then be sure that the Studies contributed toward those ends. In this regard three basic assumptions were made:

1. The tools of RDD&E hold considerable promise for the solution of problems within education, but before that promise can be realized they must be better understood, more fully developed, and better adapted to the particular requirements of education;

2. The development and/or adaption of RDD&E to meet the requirements of education can be accomplished best through empirical investigation; and

3. Prerequisite to empirical investigation is a conceptual structure that marks the boundaries of that which is to investigated and identifies the elements within those boundaries that are to be subjected to investigation.

Given such a point of view, the basic challenge of the Oregon Studies was seen as being no less than laying the foundation for a discipline of educational RDD&E, providing a good first approximation to the conceptual structure of that discipline, providing a reliable methodology for its empirical investigation, and providing a first set of empirical observations that tested the fit of the proposed conceptual frame with the realities that exist. Just as the journey of Lewis and Clark opened the western part of the United States to exploration, development, and commerce, and the explorations of Cousteau and the Apollo program have opened the oceans and the solar system to similar possibilities, the Oregon Studies were designed to turn the tools of educational RDD&E upon themselves and so open the field to exploration and development in service of American education. In the judgment of those who have been most deeply involved in the project the perception of the challenge as anything less would have been to miss the point of the whole effort.

References

Chase, F. G. R & D in the remodeling of education. Phi Delta Kappan, Feb. 1970, 220-304.

Gideonse, H. D. Educational research and development in the United States. Washington, D. C.: U. S. Department of Health, Education, and Welfare, Office of Education (OE-12049), 1969.

Gideonse, H. D. Research and development for education: a market model. In The Oregon Studies in Educational RDD&E: Conceptual Frameworks, ed. H. Del Schalock and G. Roger Sell, Teaching Research, Monmouth, Oregon, 1972, Vol. III, 12-48. (OEG-0-70-4917-0701)

Schalock, H. Del, & Sell, G. Roger. A framework for the analysis and empirical investigation of educational RDD&E. In The Oregon Studies in Educational RDD&E: Conceptual Frameworks, ed. H. Del Schalock and G. Roger Sell, Teaching Research, Monmouth, Oregon, 1972, Vol. III, 193-261. (OEG-0-70-4917-0701)

Worthen, B. R., Anderson, R. D., & Byers, M. L. A study of selected factors related to the training of researchers, developers, diffusers and evaluators in education. Washington, D. C.: The American Educational Research Association, 1971. (Final report of USOE Grant OEG-0-71-0617-520)

Worthen, B. R., & Byers, M. L. An exploratory study of selected variables related to the training and careers of educational research and research-related personnel. Washington, D. C.: The American Educational Research Association, 1970. (Final report of USOE Grant OEG 0-9-180240-3757-010)

Chapter 2

PREPARATIONS

As with any exploratory effort a great many preparations had to be made for the journey. Personnel had to be selected and trained, information about the territory to be traversed had to be collected and reviewed; charts and maps had to be prepared as guides to the journey; the limits of the territory had to be mapped, the dimensions of that territory to be attended to in the mapping process had to be established; instruments had to be developed that would permit the collection of trustworthy information for use in map building; and the specific route to be followed during the course of the mapping venture, and the specific sites to be studied along that route had to be determined. The purpose of the present chapter is to fill in the steps taken in the Oregon Studies in making these various preparations. The course charted by the Studies, and the specific sites selected for study along the way, are described in Chapter 3.

Selecting, Organizing and Preparing Personnel

With one exception key staff positions were filled with personnel from the Teaching Research Division of the Oregon State System of Higher Education. Dr. Del Schalock served as project director; Dr. Dale Hamreus as associate director and coordinator of instrumentation during PHASE I of the project; Mrs. Bette Porter as coordinator for the preparation of the compendium of available literature; and Mr. Roger Sell as coordinator for the preparation of the conceptual papers that served as guides to the expedition. During PHASE II of the project Dr. Harry Ammerman replaced Dr. Hamreus as associate project director and assumed the role of coordinator of data preparation and reporting; Dr. Hamreus assumed the role of coordinator of site selection, visitation and scheduling; and Mr. Gregory Thomas assumed the role of coordinator of data collection. The personnel serving under the various task coordinators are identified in the Preface to the volume. Overall project coordination was achieved through a council composed of task coordinators, the project director and the associate director.

With few exceptions staff assignments on the project were filled by persons who had had experience in the performance of similar or related tasks. Thus, for example, both Dr. Hamreus and Dr. Ammerman had had extensive experience in task and job analysis; Mrs. Porter had had experience in library research and bibliographic preparation; Mr. Thomas had had experience in the management of large, computer based data files; and a central core of the data collection team had had experience in interview methodology and/or the preparation of case histories. All of the staff, however had to develop a range of new skills in order to meet the demands of the project. The conduct of interviews around project outputs rather than job definitions, the preparation of case profiles as data repositories rather than interpretative summaries and the articulation of a continuously evolving methodology and conceptual framework were tasks that demanded the development of new skills on the part of everyone involved.

Collecting and Reviewing Available Literature

Since the domain of educational RDD&E had been traversed by a relatively large number of earlier travelers, and since many of them had recorded their observations, experiences and thoughts while there, it seemed prudent to take full advantage of the information available in recorded form. Accordingly one aspect of the project called for the careful review of the literature that pertained to the nature of educational RDD&E, and the compilations of the best of that which existed in a volume that could be used by the expedition staff as well as by others interested in the territory. Specifically, the articles collected for the volume were to serve three purposes: (a) a basic literature source for the preparation of the conceptual papers appearing in Volume III; (b) a basic literature source for the development of the methodology that was to be used in carrying out the empirical study for which the Oregon Studies were responsible (See Volumes IV and V); and (c) a basic literature source for students and staff in training programs, and personnel in the field. As such it was to represent the first attempt to draw together the literature on the nature of and the interdependencies between research, development, diffusion, and evaluation in the field of education.

Five specifications guided the development of the compendium of literature:

1. The articles selected were to be supportive of the conceptual and methodological thrusts within the Oregon Studies, that is, they were to be informative as to the nature of and similarities and differences between educational RDD&E activities;

2. Within the limits of the literature available, the collective set of articles was to attend as fully to development, diffusion, and evaluation activities as it did to research;

3. The articles were to be representative of the full range of views that existed in the published literature about such activities;

4. The articles were to be of a quality that would permit them to be judged "seminal" in nature; and

5. The articles were to be classified according to their R,D,D, or E focus, or some combination thereof, and organized within the compendium so that readers could gain easy access to them under an R,D,D, or E label.

To meet these specifications a five-step process was followed in article selection. The first step involved an extensive review of the literature. At this level the screening process was gross, for essentially any article that dealt conceptually with any aspect of the domain was catalogued for submission to the second-level screen. The literature searched included all issues of Research in Education, Reports of Research in Education, Current Index to Journals in Education, Education Index, RAND Publications, Dissertation Abstracts, Applied Science and Technology, and U.S. Government R&D Reports published between 1960 and 1970. Staff members and consultants served as additional sources for the identification of articles. At the completion of this step in the selection process over 500 articles had been identified for further consideration.

The second step in the process involved the careful reading of each article identified in the initial search, judgment as to its appropriateness to the volume, and judgment as to its overlap with other articles. This step was carried out by three staff members who were not involved in the conceptual or methodological thrusts of the Studies. At the completion of the second-level screen 240 articles remained.

The third step of the selection process involved a review of the surviving articles by staff members working on the conceptual and methodological aspects of the project. Each of the 240 articles was forwarded to three staff members who read and responded to them on a standard form. The form called for judgments as to the intent of the article, its substantive content, the working groups within the Studies it would best serve, the utility of the article to that group, and whether the article should or should not be considered further for inclusion in the compendium. In most cases an article was retained when two of the three staff members who read it recommended it for inclusion. One hundred and thirty-one articles survived this step in the screening process.

The fourth step in the process involved a formal review of the 131 articles by a panel of judges. The panel was composed of compendium staff members, Dr. Gordon Hoke of CIRCE, University of Illinois at Champaign-Urbana, and Dr. Don Coombs, Associate Director of ERIC at Stanford University. Final judgments as to the inclusion-exclusion of articles were made by the panel at a four-day retreat. All inclusion judgments required the consensus of the panel. Eighty-nine articles met this criterion.

The fifth step in the selection process involved the review of the recommended articles in compendium form by a number of U.S. Office of Education staff members, training program directors, students in training, and participants in the 1971 meeting of the American Educational Research Association. As a result of this level of review, a few of the articles included in the initial compilation were excluded, and a few that had either been missed in the initial literature search or that had been excluded for one reason or another along the way, were added. As the volume currently stands it contains 86 articles distributed across various combinations of RDD&E activities. Research receives emphasis in 34 of these articles, development in 30, diffusion in 24, and evaluation in 35.

In order to meet space requirements, some extracts from larger documents have been included in the compendium. Minor editing also has been done on some articles to sharpen their focus on the issues of concern in the compendium. All documents so modified have been approved for inclusion in the compendium by their senior authors.

The Preparation of Charts and Maps as Guides to the Expedition

The charge to the Oregon Studies "to map the domain of educational RDD&E" carried with it a number of constraints: (a) with the time and resources available, the mapping process would have to be limited in its coverage of the domain, that is, only a sample of the sites that could be studied for mapping purposes would be studied and only a selected set of dimensions that could be attended within sites would be attended to; (b) in a similar vein the number of parameters or features within the territory comprising the domain of RDD&E dictated the necessity of sampling within them; (c) the decisions relative to which dimensions of the territory, e.g. topological, economic, cultural, should be given attention were confounded by a paucity of indicators as to which would prove most profitable; (d) the collection of data, and thus the development of data collection methodology had to await clarification of such matters; and (e) the project had the responsibility of clarifying the parameters of the domain and the critical variables within before the mapping process was to begin. As a consequence the project faced an enormous conceptual task, and an equally enormous methodological task, before actual mapping activities could get under way.

The vehicle chosen for purposes of conceptual clarification was the commissioning of independently prepared conceptual papers by persons knowledgeable of the territory to be mapped, the repeated public interface of the papers, and the insistence that they be reconstructed after each public review. The purpose of the present section of the chapter is to describe the process by which the collection of conceptual papers was developed. The preparation of the conceptual framework that guided the empirical thrust of the Oregon Studies is described in the section that follows.

Five specifications guided the development of the conceptual papers:

1. Each was to define, differentiate, and relate educational RDD&E activities, and provide a rationale for the particular point of view taken in doing so;

2. In combination, the papers were to provide a set of alternative views as to the nature and function of RDD&E activities within the context of education;

3. In combination, the papers were to be inclusive of the various segments of and points of view within the domain of educational RDD&E;

4. In combination, the papers were to provide a synthesis and an extension of ealier conceptual efforts; and

5. At least one of the papers was to be data dependent, that is, it was to be fashioned against and consistent in final form with the framework that guided the empirical thrust of the Oregon Studies.[1]

To meet these specifications, authors were sought who were both well recognized and respected for their contributions to the field, and who held differing points of view as to the nature of and interdependencies between the elements within it.

Dr. Hendrick G. Gideonse, for six years Director of the Division of Planning for the U.S. Office of Education's National Center for Research and Development, and, at that time, a professional staff member of the Subcommittee on Executive Reorganization and Government Research, United States Senate, and Adjunct Professor of Policy Science at State University of New York at Buffalo, prepared the paper that appears first in the volume. His long experience in the management of RDD&E activities at the federal level, his interest and participation in policy decisions affecting such activities, and his work as a historian of the field, qualifies him uniquely to address the topic from the point of view of an "informed bureaucrat." From that frame of reference Dr. Gideonse is of the opinion that the conception of research and development traditionally held within education is counterproductive, and he makes that opinion known in his paper, "Research and Development for Education: A Market Model." Reflecting as it does a questioning of the basic assumptions that have governed the practice of educational RDD&E, his paper provides a good point of departure for thinking generally about the role of RDD&E activities within the context of education.

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[1] The initial plan for the conceptual papers called for their synthesis into what was termed a "preferred" framework. That framework was then to serve as the conceptual base to the empirical and methodological efforts within the Oregon Studies. The assumption underlying the plan was not only that a synthesis could be achieved, but that it should be--both for the benefit of the Oregon Studies and the field as a whole. When the first drafts of the papers were reviewed, however, it was apparent that the notion of synthesis would have to be abandoned. The views presented in the papers were so diverse, and were held with such conviction, that the probability of reaching consensus on a single framework--especially in time for it to be of value to other aspects of the Studies--was near zero. As a consequence, it was decided that only the paper to be prepared by the Oregon Studies staff was to be data dependent, and the writers of the other papers were to be free to develop their respective ideas without regard to the criterion of data dependency or the desire for synthesis.

The second and third papers in the volume deal more directly with the practice of and interrelationships between educational RDD&E. The second paper, "Educational Inquiry and the Practice of Education," authored by Drs. Gene V Glass and Blaine R. Worthen of the Laboratory for Educational Research, University of Colorado, focuses heavily upon the nature of educational research and evaluation, and their relationships to the improvement of education. Both Dr. Glass and Dr. Worthen are well known for their concern about these matters, and for their active role in the work of the American Educational Research Association. It is not accidental, therefore, that their paper reflects the "classic" or "AERA" position with respect to the nature and function of RDD&E activities within the context of education.

Dr. Leslie J. Briggs, Professor of Education at Florida State University, long recognized for his pioneering work in educational systems development, is author of the third paper, "Development and Diffusion as Mechanisms for Educational Improvement." In his paper, Professor Briggs addresses the dual problems of developing demonstrably effective educational practices, and getting those practices into wide use in the schools. After reviewing the literature that pertains to these issues, he outlines a research-based model of development that he believes incorporates within it the elements needed to assure both sound development and widespread diffusion. While there is some overlap of effort between the Briggs and Glass-Worthen papers, it is not so great as to appear redundant.[2]

The paper prepared by Dr. Schalock and Mr. Sell of the Oregon Studies staff differs from the other papers in that it sets the stage for and provides the concepts used in the empirical thrust of the Oregon Studies. As such, it provides basic definitions of the concepts of educational RDD&E, differentiates rather carefully between them, and spells out their interdependencies in largely operational terms. It provides a review of the existing literature as a basis for the definitions offered, and provides a rationale for thinking of RDD&E activities as "problem-solving tools" within the context of education. In contrast to the other papers, it does not deal with what "ought" to be with respect to the role of such activities in education, or make recommendations as to policy with respect to the long-term support and/or implementation of such activities. The title of the Schalock-Sell paper, "A Framework for the Analysis and Empirical Investigation of Educational RDD&E," accurately reflects its contents.

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[2] Only three papers were commissioned initially for the inclusion in the volume. Upon the first review of those papers, however, it was the consensus of all writers and reviewers that a paper should be added that dealt expressly with the concepts of educational development and diffusion. Dr. Briggs, who was serving as a reviewer of the papers at the time, accepted the invitation to prepare such a paper.

In addition to the careful selection of authors as a means of assuring quality in the volume as a whole, and differences represented in point of view, each paper was submitted to a formal critique by an independent reviewer. Also, the papers as a set were submitted to formal critiques by two independent reviewers. Dr. David L. Clark, Dean of the School of Education, Indiana University, prepared the critique of the Gideonse paper; Dr. Paul D. Hood, Director of the Communications Program, Far West Laboratory for Educational Research and Development, prepared the critique of the Glass-Worthen paper; Dr. Norman J. Boyan, Dean of the Graduate School of Education, University of California, Santa Barbara, prepared the critique of the Briggs paper; and Dr. Glen Heathers, Professor of Education, Learning Research and Development Center, University of Pittsburg, prepared the critique of the Schalock-Sell paper. Dr. J. Thomas Hastings, Director of the Center for Instructional Research and Curriculum Evaluation, University of Illinois, and Dr. Francis S. Chase, Educational Consultant, Professor (and Dean) Emeritus, The University of Chicago, prepared, respectively, the introductory and summary critiques of the papers as a set. By providing for such critiques, and allowing an opportunity for authors to respond to them, it was hoped that the strengths and weaknesses of the papers--individually and collectively--would be explicated. It was also hoped that it would open a dialogue at the conceptual level that would continue, for without such interchange there is little hope that educational RDD&E will ever achieve the vitality and sophistication that it must if it is to make an observable difference in the practice of education.

Finally, the procedure followed in the preparation of each of the papers in the volume, and to some extent their critiques, was also designed to further their quality and sensitivity to differing points of view. The first step in the process was to submit draft copies of the three base papers to public review (a two-day conference held on July 26 and 27, 1970), some three months after the papers had been commissioned. With one exception all of the critiquers of the papers, the four continuing consultants to the Oregon Studies,[3] U. S. Office of

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[3] The continuing consultants to the Studies were Dr. Harry L. Ammerman, an industrial psychologist with the Human Resources Research Organization; Dr. Samuel Sieber, a social psychologist at the Bureau of Applied Social Research, Columbia University; and Dr. James Watson, a social anthropologist at the University of Washington. Dr. John E. Hopkins of Indiana University, while technically a consultant to the U. S. Office of Education, also functioned as a continuing consultant to the project throughout its history. Following the October conference, Dr. Ammerman joined the project staff.

Education representatives,[4] and selected staff from the Studies took part in the review. Copies of the papers were made available to participants prior to the conference. The critiquer assigned a particular paper led the review of that paper at the conference.

A second conference was held in mid-October, at which time a second draft of the initially commissioned papers, and a first draft of the Briggs paper, were reviewed. As in the first conference, the standing consultants to the project, U.S. Office of Education representatives, and selected staff members from the Oregon Studies took part in the review. In place of the critiquers, however, were the directors of 12 USOE funded projects to design new training programs for the preparation of RDD&E personnel. (The relationship between the training design projects and the Oregon Studies was discussed in the preceding chapter.) The rationale for the substitution was that input to the papers at that point in time by persons who had been thinking about similar issues, but within an applied context, would be of greater benefit than a second round of review by persons who were to have an opportunity to formally critique the papers at a later time.

The July and October conferences constituted the only formally planned sources of input to the preparation of the papers and critiques. Authors used other sources, of course, but what those were, and when and how they were used, was a matter of their own choosing. No formal mechanism was established to provide for face-to-face interaction between critiquers and writers, or between critiquers and critiquers, beyond the July conference. Also, no formal provision was made for the interaction of the authors of the papers with the critiquers or with the editors of the volume beyond the July and October conferences. As a consequence, the form and substance of both the papers and critiques are very much a matter of the author's own style, point of view, and interpretation of role.

Specifying the Parameters of the Domain of Educational RDD&E, and the Dimensions to be Mapped Within It

With the demise of the notion of a preferred conceptual framework emerging from a combination of the four conceptual papers, which was to serve as the conceptual base for the empirical thrust within the Oregon Studies, the responsibility for preparing such a framework shifted to the staff of the Studies. This meant, in effect, that the conceptual frameworks prepared by others served essentially as reference documents to the framework prepared by the staff of the Oregon Studies, and that the authors of other papers served essentially as advisors to it. The Schalock-Sell paper, described in the previous section, constitutes the conceptual framework that guided the empirical thrust of the project.

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[4] The U. S. Office of Education representatives attending the two conferences were Drs. Cora Beebe, from the Planning and Evaluation Division, John Egermeier, head of the Research Training Branch, and Paul Messier, at that time Director of the Division of Higher Education within the National Center for Research and Development. Dr. Messier is now directing implementation planning for the proposed National Foundation for Higher Education.

Procedurally, the framework developed by project staff was prepared quite differently than the other conceptual papers. While it was submitted to the same review and critiquing process as the others, and thus referenced against the content of the other conceptual papers and profited from the advice of those authors, it was also referenced against the operational demands of a data collection methodology and the realities of ongoing RDD&E activities. The strategy followed in preparing the framework was one of arriving at a given level of conceptual clarification, translating this into a workable data collection methodology, applying the methodology to the observation of ongoing RDD&E activities, and, on the basis of the data derived from these observations, refining both the conceptual framework and the data collection methodology. This cyclical process permitted a continuous test of the adequacy of the conceptual frame and the methodology.

During the course of the project a half dozen revision cycles were completed. Each cycle involved the application of both the conceptual frame and the methodology to differing kinds of RDD&E activities. By the end of the project both the conceptual framework guiding the methodology, and the methodology itself, had been applied to and found to be functionally descriptive of research, development, diffusion, and evaluation activities that had a wide variety of foci, that varied greatly in size and complexity, and that were carried out within a number of differing contexts.[5]

As it stands presently the framework consists of formal definitions, relational terms, and a taxonomic structure that provides a language for describing both the vehicles or mechanisms that carry RDD&E activities (projects, programs, institutions), and the structure, function, and operation of those mechanisms. Specifically, the framework consists of seven interrelated conceptual sets: one which provides basic definitions for educational RDD&E; one which provides for the description of the interactions between RDD&E activities as they occur within the context of education; one which provides for the description of vehicles which carry educational RDD&E; and four which describe the organization and operation of such vehicles--their outputs, the operations required to produce their outputs, and the inputs and organizational structures required to carry out their operations. Collectively, the first three of the seven conceptual sets were designed to map the external parameters of the domain of educational RDD&E, and the last four were designed to map the critical factors affecting operations within it. In combination they were intended to identify all of the major dimensions of, elements within, and interactions between RDD&E activities as they occur within the context of education. The Schalock-Sell paper that explicates the framework appears as Chapter 4, in Volume III of the series of volumes reporting the Oregon Studies.

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[5] While the framework will undoubtedly need to be revised or extended to accommodate RDD&E activities not encountered during the course of its development, or as other dimensions of RDD&E activities are selected for study, the framework as it presently exists is believed to reflect the critical parameters of the domain of RDD&E, and the critical factors affecting operation within it.

As developed the framework was seen as providing the conceptual tools needed to describe or map the domain of educational RDD&E as a whole, or any given R, D, D, or E activity within it. It also provided a language that permitted reliable communication about that which was to be mapped, and a way of thinking about RDD&E generally within the context of education.[6]

Developing the Methodology to be Used in Mapping

Much has already been said about the development of the data collection methodology. The preceding chapter described (1) the reasons for employing case study approaches to the problem, (2) the case profile format for data preparation, and (3) the rationale for selecting output analysis as the primary organizing concept for the evolving methodology. The linkage between conceptual effort and methodology development was described in the previous section of this chapter. The following discussion briefly describes the methodology used and elaborates the processes by which it was developed. A detailed description of the methodology and its development may be found in Volume V of this series.

Operationally, the methodology is divided into two phases: a general mapping phase, and a detailed mapping phase. The general mapping of an RDD&E activity (PROJECT or PROGRAM) involves five basic steps:[7]

1. Identify the output (PRODUCT, EVENT, CONDITION) expected by contractual obligation to emerge from a particular R, D, D, or E activity (the FOCAL OUTPUT of a project or program).

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[6] It is probable that the framework and its category sets are applicable to the description of RDD&E activities in fields other than education, but as yet they have not been tested in that regard. Chapter 4 in the present volume contains a description of all the data sets within the Oregon Studies that contributed to the language of mapping.

[7] For definitions of terms appearing in capital letters in the discussion which follows, see the GLOSSARY.

2. Identify outputs that constitute an essential part of or are prerequisite to the development of a focal output, for example, a research design, a testable hypothesis or set of hypotheses, reliable and valid measures (the outputs of a RESEARCH project), or a product specifications list, instructor and user manuals, and field test results in support of the creation of a reliable instructional system (the outputs of a DEVELOPMENT project).

3. Organize all of the outputs associated with a particular R, D, D, or E activity into a schematic which illustrates their hierarchical and/or interdependency relationships (an OUTPUT MAP).

4. Select the outputs for which detailed information is desired.

5. Identify the person or persons most knowledgeable of and/or involved in the development of selected outputs.

A detailed mapping of an R, D, D, or E activity is made only in relation to outputs selected for intensive analysis. When applied it involves three basic steps:

1. Identify the standards set for a particular output, and the indicators acceptable or used as evidence of the realization of those standards.

2. Identify the operations (FUNCTIONS, ACTIVITIES, TASKS, ACTIONS) required to produce a particular output according to the standards that have been set for it.

3. Identify the enabling knowledges, skills, and sensitivities (ENABLERS) reported by project personnel as being essential to the production of a particular output and the performance of related tasks.

Coincidental to the mapping of a project or program is the collection of a wide range of supplementary data about it. This includes types of personnel associated with the production of particular outputs, their background of training, etc.; the perceived criticality of particular knowledges, skills, and sensitivities to the production of particular outputs; circumstances surrounding the initiation of the project, the rationale for the design employed, and the difference the project is expected to make; and a description of the characteristics, contexts and dynamics of the project or program as a whole. The decision rules governing the application of the methodology, the category sets contained within it, and the procedural steps to be followed in its use are described in detail in Volume V of the series reporting the Oregon Studies.

As the methodology now stands, data can be generated for virtually all of the variables that appear within the conceptual framework. This was the intended outcome, of course, and the decision to let the methodology remain open to change throughout the life of the project, the strategy of forcing the framework to be translated into a data generation methodology, and the strategy of then checking the adequacy of both the framework and the methodology by reflecting them against ongoing RDD&E activities, was designed to insure a direct relationship between the two frameworks. This then represented a conscious attempt to ground a data collection methodology in theory. The methodology and the data it generated, however, were also referenced repeatedly against others who were knowledgeable of the field, or who were in one way or another involved in it. Thus, the authors of the conceptual papers reviewed the methodology each time that their papers were reviewed; all of the directors of the USOE-sponsored projects responsible for the design of new training programs were able to review it at least once; representatives from the fields of social anthropology, social psychology and industrial psychology reviewed it on three occasions; Office of Education personnel and their advisory staff were party to its development from beginning to end; and project personnel discussed it with the parallel AERA project director and staff on numerous occasions. In the overall plan of the project the referencing of the methodology against the conceptual-empirical demands placed on it, and against the variety of points of view represented by the persons just mentioned, was designed to insure that it would be adequate to the demands that would be placed upon it if a discipline of educational RDD&E were ever to be developed.

Chapter 3

THE COURSE CHARTED

Every expeditionary force must in time decide upon the specific route it is to travel and the sites it is to study. The Oregon Studies were no exception. Once the territory or domain to be mapped had been identified, i.e., once operational definitions had been assigned RDD&E, and the variables to be attended to in the mapping process had been specified, i.e., the conceptual framework guiding the Oregon Studies had taken shape, a decision had to be made as to the specific RDD&E activities to be studied for purposes of map building. Just as Lewis and Clark could not cover all of the rivers, mountains, valleys and plateaus of the Northwest in their first mapping expedition, and the Apollo 14 mission could not cover all of the moon's surface, the Oregon expedition, given the time and resources available to it, could not study empirically all ongoing or completed RDD&E activities in education. A problem that faced the planners of the Oregon Studies, then, just as it faced the planners of the Lewis and Clark and the Apollo expeditions, was one of site or route selection.

Six decisions made early in the Studies had major implications for the matter of route and site selection, and thusly, map preparation: (a) the decision to study ongoing instead of completed RDD&E activities, (b) the decision to study RDD&E activities at the project rather than the program or institutional level; (c) the decision to give primary emphasis in the map building effort to the preparation of detailed site maps (case profiles); (d) the decision to prepare site maps for exemplary projects only, that is, projects that were judged to be of high quality and illustrative of the directions that RDD&E activities were likely to take within the context of education in the future; (e) the decision to view the preparation of the site maps as a proving ground for the case study methodology that the Oregon Studies was to develop; and (f) the decision to prepare outline maps of the domain of educational RDD&E as a whole on the basis of the data contained in the site maps. The rationale underlying these basic design decisions, and the consequences that followed from them, are described in the pages that follow.

Rationale

In some cases the rationale underlying the decisions just described was relatively complex, and in others relatively simple and straightforward. In all cases, however, a rationale existed, and since the various decisions were basic to the design, operation and results of the Oregon Studies, the rationale underlying them should be made explicit. For the purpose of providing comprehensive information each decision is considered separately.

The Decision to Study Ongoing RDD&E activities

In broad terms a decision to use either ongoing or completed educational RDD&E activities as a basis for the mapping effort had to be made. Three factors led to the decision to study ongoing activities: the greater accessibility of persons associated with ongoing activities as information sources; the likelihood that persons associated with ongoing activities would be able to provide more detailed information about them than would persons having to depend upon long-term recall; and the desire to study activities that were the closest possible forerunners to educational RDD&E activities of the future.

The Decision to Study RDD&E Activities at the Project Level

Three alternative levels of educational RDD&E activity were considered as a basis for map building: projects, programs, and institutions. Arguments were marshalled for each, but, in the end, projects were selected as the most meaningful and manageable unit of study at the present time. For purposes of the Oregon Studies a project was defined as "a formally recognized, funded, and directed effort aimed at achieving one or more specified ends that have their definition in educational research, development, diffusion, and evaluation." Two arguments were extended that led to the choice of project as the unit of study. First, even though educational RDD&E programs exist (a coordinated set of projects), and even though educational RDD&E institutions exist (an agency responsible for a coordinated set of programs), for example educational laboratories and centers, the project still functions as the primary organizational unit within the domain of educational RDD&E, i.e., it serves as the primary organizer of work, people, resource allocation, products, etc. Second, the project as an activity is usually reasonably well defined, time bound, and manageable in terms of size and complexity.

The Decision to Emphasize Site Maps

The rationale for choosing to focus major attention in the Oregon Studies on the preparation of "site maps" (case profiles) for the projects studied rested upon two interrelated propositions: at the time that the Oregon Studies were undertaken little was known about educational development, diffusion, and evaluation activities, about how such activities related to educational research, or about how any or all such activities related to the improvement of education. In order to understand matters not understood it was deemed wise to begin by describing them in detail. The rationale for reporting such descriptions in case profile format was, simply, that such a format invited a more detailed description of project characteristics and activities than might otherwise be provided. This was assumed to be true in the identification of the variables to be attended to in describing projects, and in the exploration of the interactions of those variables.

As such, the site maps or case profiles were to serve the purposes of both science and training. In support of science the profiles were to serve three functions: the careful description of a phenomenon of interest; the proving ground for a methodology to carry out such descriptions; and the development of a data base that would support a preliminary "mapping" of the domain of educational RDD&E. In support of training the profiles were to serve two functions. At the first level of importance they were to provide a means of gaining insight into the nature and function of individual educational RDD&E projects. Secondarily they were to provide a means of gaining insight into the nature of the domain of educational RDD&E as a whole. It was the belief of the designers of the Studies, and the advisory body that worked with them, that greater benefit would accrue to the field at its particular stage of development from the availability of a small number of detailed site maps than a large number of very general maps.[1] It was the belief of the persons responsible for planning the Oregon Studies that the need for detailed, rudimentary kinds of information about the nature of educational RDD&E simply outweighed the need for the kinds of information typically made available through survey procedures. The 20 case profiles presented in Volume IV of the series of Volumes reporting the Oregon Studies reflect that decision.

The Decision to Prepare Site Maps for Exemplary Projects Only

Once the decision was made to emphasize the preparation of site maps within the Studies, an accompanying decision was reached to prepare such maps only for exemplary projects. The rationale for this decision was straightforward: if only a small number of projects were to be studied they should be illustrative of the kind of project activities anticipated or desired in the future. Some thought was given to the preparation of site maps for projects that were experiencing severe difficulties, or that were judged likely to fail, but it was concluded that with the resource base available a greater information yield would likely come from the study of successes rather than failures. The criteria used and procedures followed in identifying exemplary projects are described at a later point in the chapter.

The Decision to Use the Site Maps as a Proving Ground for the Case Study Methodology

The decision to describe educational RDD&E projects in case profile terms required that a methodology be developed that would generate "case study" data. The development of such a methodology became a primary focus of the Oregon Studies, and the preparation of profiles (site maps) was, to a large extent, a natural culmination of that focus. Two assumptions accompanied the emphasis on methodological development. First, the Oregon Studies represented only the first in a series of empirical studies to be undertaken on the nature of educational RDD&E. Second, greater benefits would accrue to education over the long term by directing the limited resources available to the development of strong methodology than to the collection of large amounts of data with a weak methodology.

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[1] The number of case profiles that could be prepared with the time and resource base available to the Studies was estimated at 20.

As a proving ground for methodology the profiles provided a basis for making two kinds of judgments: judgment as to the sophistication of the methodology, i.e., the extent to which the methodology generated accurate, reliable, and reasonably exhaustive descriptions of educational RDD&E activities; and judgment as to the robustness of the methodology, i.e., the extent to which the methodology was able to be applied to widely varying projects with equally productive results. Evidence as to sophistication was obtained by submitting completed profiles of projects to the directors of those projects for review and approval (in all cases the profiles met the necessary criteria of sophistication). Evidence as to robustness was obtained by applying the methodology to widely varying projects. It was assumed that if the methodology was indeed adequate in terms of its robustness widely varying projects could be described with equal facility and the data generated in relation to each project would be roughly comparable.

The Decision to Prepare Outline Maps of The Domain as a Whole on the Basis of the Data Collected for Site Maps

The decision to view the profiles as a data base for identifying or "mapping" the parameters of the domain as a whole emerged as a logical extension of the two previously discussed profile functions. Since extensive descriptive data were to be made available on the nature of educational RDD&E as a result of profile development, and since profiles were to be prepared for widely varying projects to test the robustness of a methodology, it seemed reasonable to think that the data presented in the profiles could serve as a basis for at least launching the process of mapping the domain as a whole. Accordingly, the selection of the projects to be described was approached from the point of view of their being a sample of the projects that exist within the domain of educational RDD&E as a whole. Given the small number of projects that could be described in case study form with the resource base available, and given the variability that was to be reflected in those projects, no illusions were held about the representativeness of the sample that could be drawn. At the same time, it was reasoned that if the projects to be described sampled at all well the variability that existed within the domain, the descriptions of those projects would provide at least a beginning base for sketching an "outline map" of the parameters of the domain. The sources of variability sampled by the projects selected are described at a later point in the chapter.

As a data base for mapping the domain of educational RDD&E, the profiles actually served two functions, a basis for mapping the parameters of the domain and a basis for mapping the commonalities or central tendencies of the domain. As a basis for parameter mapping the profiles constituted an excellent source of data. Even though the project sample was small, and the absolute data base on which to prepare maps limited, projects were selected so as to insure that they were reasonably representative of the range of projects to be found within the domain. Thus, the range of personnel employed in the projects described, the range of project strategies followed, the range of organizational structures used, the range of outputs produced, the range of tasks performed, the range of standards held, and the range of knowledges, skills, and sensitivities drawn upon in project execution can be assumed to be reasonably representative of the range of such things to be found within the domain as a whole.

Given the project sampling strategy followed, however, it is obvious that the profiles constituted a much weaker data base for mapping commonalities or central tendencies. Clearly, the sample was drawn to highlight the parameters of the domain rather than its central tendencies. Nevertheless, it was assumed that the data, limited as they were, were amenable to central tendency analyses, and such analyses were undertaken. The data reported in Chapters 6, 7, and 8 of the present volume represent the domain as a whole.

Site Selection Criteria

Given the decision to study in detail approximately 20 ongoing educational RDD&E projects as the basis for the mapping to be done within the Oregon Studies, and the accompanying decision that those 20 projects were to be illustrative of the range of projects found within the domain, the specific criteria to be used in selecting projects became a matter for consideration. These were fashioned during the course of two review conferences that dealt with the matter of methodology, case profile design, and project selection. Six selection criteria were finally specified: (a) an approximately equal distribution of projects across project foci, that is, across research, development, diffusion, and evaluation; (b, c, d) within each project focus the projects selected were to vary widely in size (funding base), institutional setting and stage of completion; (e) a staff of at least two professional persons working at least half of their time on the project, or three professional persons working at least a third of their time; and (f) the pool of projects was to be distributed geographically. In keeping with the rationale for the intensive study of a small number of projects, all projects were to be exemplary in nature and illustrative of the kinds of educational RDD&E activities likely to be pursued in the future.

In reviewing these criteria it is obvious that they were designed to optimize the variability within the projects studied. It is also clear that from the point of view of hypothesis testing, central tendency identification, the fixing of sources of variability, or any of the other purposes for which classic sampling procedures have evolved, they represent an odd set of selection criteria. Twenty cases, selected purposely for their variability, have extremely limited utility as a basis for answering the kinds of questions typically asked by researchers. From the point of view of hypothesis generation, however, or parameter identification and methodological development--which were the prime aims of the Oregon Studies--such a sampling strategy had considerable utility. It would have been desirable to have included a greater number of projects in the sample, and using those projects to be able to sample more systematically the sources of variability within the domain, but that was not possible. Given the constraints within which the studies were operating, the sampling strategy adopted probably represents the best possible trade-off between the demands of hypothesis generation, methodological development, parameter identification, and the desire to obtain information that would have utility to the designers of personnel development programs.[2] Each of the project selection criteria is described briefly in the paragraphs that follow.

Project Focus

In the Oregon Studies the term project focus was used to define the primary work emphasis of a project, that is, whether a project was an instance of a research, development, diffusion, or evaluation activity. Since projects had to be selected on the basis of their work focus, and distinguishing criteria were not readily available between foci at the time that the Oregon Studies were undertaken, operational definitions were developed. As will be seen in the formal definitions that follow, it was the outputs of these activities that were used to sharpen the distinction. between them, instead of the nature of the activities involved.

Research:	A problem-solving strategy designed to produce reliable KNOWLEDGE, that is, facts, principles, theories, and laws that are generalizable and that can stand the test of empirical verification.
Development:	A problem-solving strategy designed to produce reliable TECHNOLOGY, that is, procedures, materials, hardware, and organizational frameworks that have a known degree of success in bringing about a particular outcome or in performing the defined operation.
Diffusion:	A problem-solving strategy designed to bring about the IMPLEMENTATION of generalizable knowledge, reliable technology, or trustworthy information. (as used here, diffusion incorporates both the concepts of DISSEMINATION and ADOPTION.)

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[2] The sampling issues involved in research aimed at hypothesis generation, parameter identification, and methodological development approximate the sampling issues involved in research aimed at theory development. For an interesting discussion of these issues see Glaser, B. G. and Strauss, A. L., The Discovery of Grounded Theory. Chicago: Aldine Publishing Co., 1967 (especially pp. 45 to 77).

Evaluation: A problem-solving strategy designed to produce trustworthy INFORMATION regarding a phenomenon which occurs in a context or environment over which the user expects to exercise influence or about which he expects to make decisions.

With these definitions as a guide the expected or contracted for outputs of projects were looked to for purposes of identifying the focus of projects.[3]

Project Size

One of the most obvious dimensions on which projects vary is that of size. It is evident that as projects increase in size the energy required to carry out management functions, differentiate staff roles, and handle the complexity of project operations generally tend to increase. As a consequence, the factor of size became an important selection variable.[4]

A number of decisions were reached relative to project selection on the basis of size: (a) current fiscal year funding base would be accepted as the definition of size; (b) projects having a funding base of less than $10,000 for the fiscal year would not be included in the sample; (c) some projects having a funding base in excess of $250,000 during the 1970-71 fiscal year would be included in the sample; and (d) an emphasis would be given to the inclusion of projects that had a funding base midway between these two extremes. The final categories of funding used for selection purposes were as follows:

Small projects - Less than $100,000 for fiscal 1971-72;

Medium sized projects - $100,000 to $225,000 for fiscal 1971-72;

Large projects - Over $225,000 for fiscal 1971-72.

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[3] Once these definitions were applied systematically to projects that were labeled, for funding purposes, as research, development, diffusion, or evaluation two things were discovered. First, many projects carry labels that do not correspond to the output definitions adopted in the Oregon Studies, for example, projects labeled evaluation are occasionally, by the definitions cited above, development or diffusion projects. Second, most projects have more than one work focus.

[4] When site selection criteria were first being considered an effort was made to select on the basis of project complexity rather than size alone. A three dimensional definition of complexity was developed, involving a combination of size, number of agencies participating in a project, and the nature of that participation, but the complexity of the criterion, and the small number of projects against which to apply it, led to the decision to select on the factor of size alone.

Setting

Another dimension on which projects obviously vary is the context in which they rest. Some occur within colleges and universities, some within R&D laboratories and centers, some within the public schools, etc. While there is no evidence that project operations differ significantly as a function of the setting within which they are carried out, the fact that they are found in different settings was sufficient to force sampling decisions to attend to them. Four broad classes of settings were defined for sampling purposes: federally supported R&D laboratories and centers; privately supported R&D centers; colleges and/or universities; and public schools, state departments of education, and professional education associations.

Stage of Completion

The last factor attended to through project sampling that was thought to affect project operations was that of stage of completion. Concern was expressed on the part of the advisory body to the Studies that all phases of project operation be studied in detail, and that to avoid the introduction of error or incompleteness to the data from dependency upon extended recall, projects should be sampled that were in various phases of completion. Such a strategy led to what came to be called the "pregnant worm" approach to data collection. In this strategy the most extensive data was collected on project operations that were ongoing at the point in time that the project was being studied, while less extensive information was obtained about project operations prior to the time of the site visit and activities projected to occur subsequent to the site visit. For purposes of project selection, projects were classified as being in one of three phases: an initial phase; a middle phase; or a final phase. Operationally, each phase was defined in terms of a third of the time that a project was to receive funding. No projects were studied in their prefunding stage or in their final report writing stage.

Staff Size

Professional staff size entered the picture as a selection criterion in a very arbitrary manner, and reflected a concern over the source of information about a project residing in only one person. The criterion that held that a minimum of two professional staff working an equivalent of half time on the project or three professional staff, each working an equivalent of a third time on the project, was designed to reduce this concern.

Geographical Distribution

The one remaining criterion used for selection purposes was that of the geographical distribution of the projects studied. To avoid the possibility of regional bias, and to have available as large a pool of projects from which to draw a sample as possible, an effort was made to select projects that were broadly distributed across the nation. Three sampling regions were used for this purpose, the east coast, the mid-continent, and the west coast.

Exemplary/Illustrative Status

The qualitative judgments called for in determining whether projects were exemplary or illustrative resulted in several complications. After considerable debate about the best way to obtain evidence about these criteria, the decision was made to rely upon peer judgment. Two such judgments were to be obtained, one from the project officer of the funding agency supporting the project, and one from colleagues within the field. Four judgment criteria were involved in relation to each project: (a) the likelihood that the project would produce worthwhile impact upon the educational community; (b) the extent to which the project was illustrative of projects to be carried out in the future; (c) the history of the performance of the project director on projects in the past; and (d) the acceptance generally by peers of the project directors' contributions in the past. The manner in which these judgments were obtained is described in subsequent sections of the chapter.

Identifying Potential Sites

At the same time that the selection criteria for projects were being defined a pool of projects was being identified from which the sample of projects to be studied could be drawn. Three steps were followed in the identification process: identifying an initial pool of projects; classifying and screening at a first level the pool identified; and classifying and screening the pool at a second level. Since the procedures involved in the various stages of identification varied considerably, each will be described separately.

Identifying the Initial Pool of Projects

In order to establish an initial pool of projects large enough to support the selection of 20 projects that met the various criteria specified, a wide range of institutions, agencies, and people were contacted. Funding agencies such as the National Institute of Mental Health, the National Science Foundation, the National Institute for Child Health and Human Development, the Office of Economic Opportunity, the National Center for Educational Research and Development, and the Bureau of Educational Personnel Development were contacted for lists of projects currently funded in the area of educational RDD&E. Foundations such as Russell Sage, Ford, Danforth, Kellogg, Carnegie and Rockefeller were contacted for the same purpose. So too were a number of colleges and universities, federally and privately funded educational R&D centers and laboratories, public schools, state departments of education and private agencies, such as the Rand Corporation, the Institute for Educational Development, and the General Learning Corporation. Persons known to be broadly knowledgeable of RDD&E

activities in the nation were also contacted for the purpose of initial project identification. The information sought about projects at this level of contact included project titles, name of project director, location of the project, level of project funding, and the duration of the project. An abstract of the project was also requested if such a document were readily available. Four hundred and twenty-one projects were identified as fitting the general perception of those responding to the inquiry as falling within the domain of educational RDD&E.

First Level Classification and Screening

The initial classification and screening of projects involved two steps. The first screen was carried out by staff from the Oregon Studies, and involved a perfunctory acceptance-rejection decision as to a project falling within or without the domain of educational RDD&E, and the existence of sufficient information to permit further inquiry about it. Three hundred and seventy-seven projects remained after this initial cut. Their distribution by focus and setting appears in Table 3.1. Their distribution by size appears in Table 3.2.

TABLE 3.1

The Distribution of the Funded Projects Identified
by Project Focus and Setting

Project Setting	Project Focus					Totals
	Res.	Dev.	Diff.	Eval.	Training	
Federally supported R&D laboratories and centers	46	40	9	17	0	112
Privately supported R&D centers	4	15	4	2	0	25
Colleges, Universities, and Professional Associations	128	53	7	25	2	215
Public Schools and State Departments of Education	5	10	5	5	0	25
TOTALS	183	118	25	49	2	377

The second step in the initial screening of projects was to have involved staff members of the Oregon Studies in visiting the various agencies that funded the projects identified for further information about them. In reviewing the agencies supporting the projects identified, however, and in anticipating the nature of the time and energy required to gain access to the project files of those agencies, the decision was made to follow this procedure only for projects that were funded by the U.S. Office of Education. The bulk of the 377 projects identified (323) were funded by the U.S. Office of Education and the directors of the various divisions within the Office had indicated they would make selected information within project files available to staff of the Oregon Studies, so, in a bow to expediency, the decision was made to obtain further information only for U.S.O.E. funded projects. The information provided by O.E. personnel in this regard was limited to information that had been prepared by project personnel, for example, project proposals, progress reports, and other documents.

TABLE 3.2

The Funding Base of the Projects Identified

Level of Funding	Funding for Project Duration	Funding for Fiscal 1971-72
Unknown	78	293
$20,000 or less	95	32
$20,000 - $100,000	87	26
$100,000 - $225,000	35	15
$225,000 - $500,000	50	8
More than $500,000	32	3

With this information in hand the staff of the Oregon Studies met with the project officers responsible for the various projects to obtain still another level of detail about them. In this meeting the accuracy of the information obtained through the project files was confirmed and/or updated, an estimate of the current phase of implementation was obtained, a description of the intra- and interinstitutional linkages within the project was obtained, judgments of the exemplary and illustrative characteristics of the project were obtained, and a judgment as to the likelihood of the project directors involved being willing to take part in the Oregon Studies was obtained. A judgment was also obtained as to the political and emotional "health" of the project from the point of view of its being able to withstand the demands that would be placed upon it by becoming a part of the Oregon Studies.

Twenty-seven project officers within the Office of Education were interviewed in this process. Prior to the interviews contact was made with them by telephone to confirm their responsibilities as project officers for the identified set of projects, to explain the nature of the Oregon Studies, and to determine their willingness to provide the kind of information needed. If the project officer was amenable, an interview was scheduled at that time. All were then sent a letter outlining the intent of the interview, the specific items of information desired, and descriptive literature on the nature and purpose of the Oregon Studies.

Second Level Classification and Screening

The third step in the screening of projects involved, simultaneously, the application of the various selection criteria to the pool of projects for which information had been obtained from project officers (123 projects remained at this point as viable projects to be studied), and the determination of independent judgments as to the quality of those projects. The initial filter strategy called for the 123 projects to be sorted first by project focus, then by geographical region, then by setting, then by funding level, and finally by stage of completion. This process was undertaken, but it quickly became apparent that the number of projects identified would not support such an elaborate filtering process. As a consequence, the decision was made to sort systematically only on the dimensions of focus and stage of completion, and then to find the best possible fit across the remaining selection variables given the constraints of sample size, scheduling, etc. Operationally this meant that within the sample of 20 projects there would be reasonably equal distribution of research, development, diffusion, and evaluation projects, and that within those projects there would be reasonably equal distribution of projects in their early, middle or late phases, but that would be about as far as balance within the sample would go. Within the sample as a whole broad geographical representation would be assured, a number of institutional settings would be represented, various sized projects would be represented, and all projects would have two or more professional staff on a half time basis, but these characteristics were not to be distributed systematically by project focus. All projects selected were judged as high in quality and illustrative of educational RDD&E activities likely to occur in the future.[5]

Fifty projects emerged from the second level screening process as the pool of projects from which the sample of 20 projects was to be drawn.

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[5] An effort was made to obtain an independent rating on the exemplary and illustrative features of the 123 projects by submitting them to a panel of researchers, developers, evaluators, and diffusers active within the field. The strategy called for submitting information about each of the 123 projects to the panel and asking them to make individually a qualitative judgment about the projects they were familiar with and/or about the previous work of the directors of the projects. The plan was to continue to cycle the projects through the panel in a modified Delphi procedure until some concensus was obtained relative to the qualitative features of some subset of the projects. After the procedure was tried, it was abandoned as essentially unworkable within the time that was available. This resulted in the qualitative judgments about projects being made initially by O.E. project officers and confirmed at an initial level by Oregon Studies staff. Subsequent judgments about quality were made at the time of the first site visit to a project.

Selecting Sites to be Studied

The 50 projects identified as a result of the series of screens that have been described constituted the final pool of projects from which the project sample was to be drawn. The final selection process involved three additional screens: (a) a conversation with the project director by telephone about participation in the Oregon Studies; (b) an onsite visit to a project for another level of information exchange, providing the telephone screen was positive; and (c) a final inclusion-exclusion decision on the basis of data obtained in the onsite visit. It was hoped that of the 50 projects identified at the start of the final selection process 40 could be retained. Given the contingencies of time, scheduling problems, and unanticipated factors that invariably decimate sampling plans, it was felt that fewer than 40 available projects would threaten the chance of obtaining completed data for 20.[6]

First Level Confirmation: Telephone

Up to the time of the first telephone call all information on potential project sites had been obtained through sources other than project personnel. At this point the directors of potential projects were called, the Oregon Studies were explained to them and they were asked whether they would be interested in participating in the studies. If positive indication was given, information available about the project was reviewed and confirmed or revised as needed. The demands of participation in the Oregon Studies were also made explicit, and if interest in participation was still indicated, and it appeared that schedules could be meshed, an appointment was made for an onsite visitation by a representative from the Oregon Studies staff.[7]

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[6] The process of specifying project selection criteria, and then applying them through the steps that have been described, required a considerable period of time. During that time the data collection methodology was under development, as was the format for the case profiles. A number of projects were analyzed in support of these developmental activities, and two of those projects were maintained as part of the final project sample. While these two projects were not subjected to the formal screens that are described in the remainder of the chapter they did meet the requirements of the selection criteria as those subsequently emerged.

[7] During the course of the successive refinements of information on projects it was interesting to note that the project officers had much more accurate information about projects at their disposal than was in the files of those projects, and that project directors, obviously, had much more accurate information about the projects than did the project officers. This seemed to be a function of both amount and currency of information. It became clear in the course of the Oregon Studies that projects are dynamic, and that their status relative to staff, staff assignment, work requirements, implementation strategies, and the like, vary almost day-to-day. It was also discovered that what appear to be project emphases in proposals do not always turn out to be the same emphases when projects are carried out in real life over time.

Second Level Confirmation: Site Visit

In most instances two persons from the staff of the Oregon Studies were involved in the initial site visit to a project, a senior staff member who functioned in the form of agency-Studies representative, and the staff member who was to head the onsite data collection team. In combination, these two persons were to complete three tasks during the course of the initial site visit: (a) provide the project director with a detailed introduction to the Oregon Studies, including the nature of the demands that would be placed upon a project director and his staff if he decided to participate in the Studies; (b) obtain another level of information about the project being considered; and (c) establish a level of familiarity, and hopefully confidence and trust, between the leader of the projected data collection team and the project director. The first task was carried primarily by the agency representative, with the aid of several explanatory documents. The second task involved an active question-answer session between the project director and both staff members of the Studies, as well as reference to additional documents or explanatory materials that were not in the possession of the Oregon Studies staff. This exchange was aimed particularly at clarifying the focal efforts within a project, identifying the outputs of those efforts, identifying the products, events, and conditions that had been created in support of the production of those outputs, gaining a clear sense of how far along the various outputs identified were in their production and determine who on the staff was involved in their production. The target of this activity was an information base that would permit staff of the Oregon Studies to prepare an "output index" and an "output map," the two documents that were basic to all data collection activities within the context of a project.[8]

It was hoped that the third task to be accomplished, that of establishing a working relationship between the leader of the data collection team and the project director, would emerge as a result of the substantive interaction that occurred in relation to the other tasks.

In most instances final project selection was made at the time of the initial site visit. By the close of the visit the representatives from the Oregon Studies were usually clear as to whether a project met the criteria needed, and the director of a project was usually clear as to whether or not he wished or was able to participate in the Studies. If participation was confirmed during the site visit a time was agreed upon for the visit of the data collection team (the time required for data collection varied in length from three to five days). Also, questionnaires that needed to be completed by project staff were left with the project director for review prior to the return of the data collection team.

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[8] The terms "output index" and "output map," as well as other terms used in the data collection process, are defined in Chapter 4.

Third Level Confirmation: First Level Data Workup

As indicated above most inclusion-exclusion decisions were made at the time of the first site visits. In several instances, however, a decision to not participate in the Studies was made on the part of a project director after the site visit. In like manner, after an initial workup of the data collected at the site visit, the decision was reached on several occasions by the staff of the Oregon Studies that resources should not be invested in the analysis of a particular project. A decision on the part of a project director not to participate tended, on the surface at least, to be related to the amount of time required on the part of staff away from project activities or in finding a time that the demands of participation could be meshed with the demands of the project. A decision to exclude a project on the basis of data collected during the site visit was based upon one of two conditions: duplication of project focus with other projects already analyzed, or the absence of personnel who could provide the information needed about critical aspects of a project. Confirmation as a project to be included in the sample came where the initial data workup was complete, all criteria for inclusion in the Studies had been met, and a firm time schedule for data collection had been negotiated.

A Description of the Sites Studied

The purpose of the paragraphs that follow is to describe the criterial attributes of the 20 projects analyzed within the Oregon Studies. Two levels of description are provided. First, the sample is described with respect to its distribution across various selection criteria independently. Following these "single dimension" descriptions the sample is described in terms of its criterial attributes as a whole.

Project Focus

A major aim of the selection process that has been described was to arrive at a sample that included five research projects, five development projects, five diffusion projects, and five evaluation projects. This distribution was approximated by what was believed to be a five-six-five-four distribution at the time that the last few projects were scheduled for analysis. Subsequent to those analyses, however, it was found that one of the four "evaluation" projects turned out to be more in keeping with the operational definition that the Oregon Studies had given to development, and so the final distribution of projects by RDD&E was, respectively, five, seven, five, three. Within the five research projects 19 contracted-for outputs were found, within the seven development projects 39 contracted-for outputs were found, within the five diffusion projects 49 contracted-for outputs were found, and within the three evaluation projects 27 contracted-for outputs were found. The broad classes of outputs represented by these various focal or contracted-for outputs is shown in Table 3.3. Factors that contribute to the variability observed in the data reported in the table are elaborated in the paragraphs that follow.[9]

TABLE 3.3

The Number and Kind of Contracted-For Outputs Identified Within the Twenty Projects Studied

Output Cluster Category	Project Focus				Totals (20)
	Res (5)	Dev (7)	Diff (5)	Eval (3)	
01 Reports/Contracts	13	6	11	11	41
02 Data Instruments/Techniques	1	0	0	0	1
03 Guides/Manuals	1	4	2	2	9
04 Work Specifications/Procedures	0	1	0	0	1
05 Work Management Systems	0	0	1	4	5
07 Resource Lists	0	12	1	0	13
08 Plans/Designs/Theories/Models	3	3	1	0	7
09 Equipment/Tools/Facilities	0	0	1	0	1
10 Publications	1	2	16	2	21
11 Promotional Materials	0	1	0	0	1
12 Instructnl Units/In-School	0	6	0	0	6
13 Instructnl Units/Extra-School	0	0	4	0	4
14 Promotional Materials	0	1	0	0	1
18 Presentations	0	0	0	1	1
20 Recommendations	0	0	2	0	2
25 Resource Accessibility	0	0	0	1	1
27 Data (including printouts)	0	1	4	1	6
28 Taxonomies	0	2	0	0	2
34 Coordinated Efforts	0	0	1	0	1
38 Training	0	0	0	1	1
43 Establishing Opns Parameters	0	0	3	0	3
44 Provision for Services	0	0	1	2	3
45 Informed Public	0	0	0	1	1
50 Disseminating Info/Outputs	0	0	1	1	2
TOTALS	19	39	49	27	134

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[9] The outputs identified within the 20 projects studied are described in detail in Chapters 7 and 9 of the present volume.

Project Size

In spite of the desire to focus most heavily upon projects of medium size ($100,000 to $225,000 per annum expenditure), the final sample included a loading in favor of small projects ($20,000 to $100,000 per annum expenditure). In the end nine small projects, six medium projects, and five large projects were analyzed. The distribution of projects by size and focus is shown in Table 3.4.

TABLE 3.4

The Distribution of Project Size By Project Focus

Project Size (per annum)	Project Focus				Totals
	Res	Dev	Diff	Eval	
Small ($20,000 - $100,000)	5	2	--	2	9
Medium ($100,000 - $225,000)	--	4	2	--	6
Large (Over $225,000)	--	1	3	1	5
TOTALS	5	7	5	3	20

Project Setting

The distribution of projects by setting turned out to be more in line with the expectations. Six projects were housed within the context of a college or university, five within federally supported laboratories or R&D centers, five within privately supported laboratories or R&D centers, and four within the context of public schools and state departments. The distribution of project settings by focus is presented in Table 3.5. The distribution of project settings by size is presented in Table 3.6.

TABLE 3.5

The Distribution of Project Setting by Project Focus

Project Setting	Project Focus				Totals
	Res	Dev	Diff	Eval	
Federally supported R&D laboratories and centers	1	1	1	2	5
Colleges, Universities, and Professional Associations	3	3	--	--	6
Privately Supported R&D Centers	1	1	3	--	5
Public Schools and State Departments of Education	--	2	1	1	4
TOTALS	5	7	5	3	20

TABLE 3.6

The Distribution of Project Setting By Project Size

Project Setting	Project Size			Totals
	Small	Medium	Large	
Federally supported R&D laboratories and centers	3	2	--	5
Colleges, Universities, and Professional Associations	5	1	--	6
Privately Supported R&D Centers	1	1	3	5
Public Schools and State Departments of Education	--	2	2	4
TOTALS	9	6	5	20

Stage of Completion

In keeping with the desire to sample projects at various stages of completion all three categories of completion, that is, initial, middle, and final phases, were represented in the sample. The distribution within those phases, however, was intentionally skewed toward the middle phase. Accordingly, three projects in their initial or early phase of development, eleven projects in their middle phase of development, and six projects in their final phase were analyzed. The decision to load the sample with projects that were in their middle or later stages of development followed the recognition that a greater amount of information could be obtained from projects in those stages of development, assuming continuity of staff, than could be obtained from projects in their beginning phases.

Geographical Distribution

The regional distribution of projects was also reasonably well balanced. Six projects were studied that were on the east coast, six on the west coast, and eight in the central region of the United States (includes the Rocky Mountains and Appalachia).

A Summary of the Project Sample

Table 3.7 summarizes the criterial attributes of the project sample as a whole. It also includes a listing of the number of professional staff associated with the 20 projects and the number of those staff interviewed.

TABLE 3.7

A Summary of the Criterial Attributes of
The Twenty Projects Studied

Project Focus and Case Profile Number[a]	Size	Setting	Phase	Professional Staff Identified	Professional Staff Interviewed
Research					
1	Small	Lab/Cntr.	Middle	12	4
2	Small	Coll/Univ.	Middle	2	2
3	Small	Pvt. Firm	Final	3	3
4	Small	Coll/Univ.	Initial	7	7
5	Small	Coll/Univ.	Middle	2	2
Evaluation					
6	Large	Pub Sch.	Middle	45	9
7	Small	Lab/Cntr.	Final	4	4
8	Small	Lab/Cntr.	Middle	4	4
Development					
9	Medium	Coll/Univ.	Final	7	7
10	Small	Coll/Univ.	Final	9	7
11	Medium	Lab/Cntr.	Initial	3	5
12	Medium	Pub Sch.	Middle	7	6
13	Small	Coll/Univ.	Initial	5	6
14	Large	Pvt. Firm	Final	12	12
15	Medium	Pvt. Sch.	Final	2	8
Diffusion					
16	Medium	Lab/Cntr.	Middle	13	6
17	Large	Pub. Sch.	Middle	36	12
18	Large	Pvt. Firm	Middle	10	6
19	Large	Pvt. Firm	Middle	112	18
20	Medium	Pvt. Firm	Middle	12	6
		TOTALS		307	134

[a] The project numbers that appear in the left hand column of the table correspond to the numbers carried by the projects as they are presented in profile form (see Volume IV of the series of volumes reporting the Oregon Studies.

Chapter 4

THE VARIABLES STUDIED

Coincidental with the choice of projects to be studied, decisions had to be made as to what was to be observed on those projects. Just as Lewis and Clark and the men of the Apollo 14 mission had to decide upon what was to be observed during the course of their journeys, and carry with them the instruments needed to make those observations, the planners of the Oregon Studies had to decide upon what was to be observed within the RDD&E projects chosen for study and prepare the instruments needed to obtain the desired observations. Obviously, not all possible variables within a project could be studied. Just as Lewis and Clark, for example, could not attend in all possible detail to the cultures of the Indian tribes or the migratory patterns of the animals or the identifying characteristics of the plants encountered along the way, the staff of the Oregon Studies could not attend to all the possible detail existing within the 20 projects selected for study. Choices had to be made, both as to what was to be observed and the level of detail that was to be brought to the observations. The purpose of the present chapter is to spell out what these choices were, why they were made, and how they were implemented in the form of data collection and presentation strategies.

Data Sets

As indicated in the previous chapter, the charge to "map the domain of educational RDD&E" carried with it two responsibilities. The first was to insure that the maps to be prepared reflected accurately the external parameters of the domain, that is, the nature and range of activities carried on in the name of educational RDD&E. The second was to insure that the maps reflected accurately the internal parameters of the domain, that is, the nature and range of activities carried on within any given educational RDD&E activity. The selection for study of projects that varied systematically as to focus, size and setting was designed to meet the first responsibility. The decision to prepare case profiles, or site maps, for each of the 20 projects studied, and the accompanying decision to utilize a case study methodology in collecting the data to be reported in the case profiles, was designed to meet the second responsibility.

Three factors influenced the choice of variables to be observed within each project: (a) the charge to prepare a case profile for each project studied that would permit a reader of the profiles to understand both the "essence" of the project being described, and the "realities" of working within it; (b) the commitment to attend to factors within projects that related directly to personnel and their preparation; and (c) the requirement that the primary variables selected for observation within projects be grounded within a conceptual or theoretical framework. As a consequence of these sources of influence, three reasonably distinct sets of variables were identified for observation within projects, and three reasonably distinct data collection strategies and data sets emerged for their description.

Data Sets that Followed from a Focus on General Project Descriptors

Five data sets were judged to be essential to understanding a project as a whole. These included (a) the objectives of, rationale for and contributions to be made by a project; (b) the timelines established for completing work within a project; (c) the organizational structure within which the work of a project was carried out; (d) the political-institutional context, as well as the intellectual context, within which a project rested; and (e) the "dynamics" of project operation. The first three data sets are self-explanatory. Context data pertain to the relationship of a project being studied to its sister projects, to the activities of the administrative unit within which it rests, and to the political-institutional context of its administrative unit.

As used in the Oregon Studies, project dynamics referred to the nature of project operations, factors influencing project operations, and/or the consequences of project operations. It involved information pertaining to procedures, feelings, patterns of behavior, or anything else that was thought to convey the "essence" of working within a particular project. Operationally, the data pertaining to project dynamics involved a description of the pooled perceptions, observations, hunches, and insights gained by the staff of the Oregon Studies during the three to five day site visit required to collect the data desired on each project. By design these data were collected in a non-systematic way (though each staff member on site carried responsibility for collecting such data, and the visitation team, as a team, was responsible for preparing the narrative statement that constituted these data), and were intentionally open to subjective judgment.

No formal category sets were developed by which to code any of these classes of data. All are reported in the form of narrative statements within the context of the case profiles.

Data Sets that Followed From a Focus on Project Personnel

Five data sets were also employed in describing the characteristics of personnel working within the projects studied. These included (a) the background of training and work experience of professional staff found within the projects; (b) a description of the job or jobs held by professional staff within a project; (c) a description of the requirements perceived for the job or jobs held; (d) the emphasis given to various classes of work activities within the context of particular job roles;

and (e) the support services and resources available to persons in the performance of their respective job roles. All of the data within these sets are reported in the form of questionnaire items.

Data Sets that Followed From a Focus Upon Work Requirements Within Projects

By and large the data sets that emerged from having to make sense of projects as a whole, and having to be clear about the nature and background of personnel working within projects, were shaped by the interaction of the staff of the Oregon Studies with the review and advisory body to the Studies. This body was made up of professional RDD&E personnel concerned with the design of new training programs, consultants from the disciplines of social anthropology, social psychology, and industrial psychology, and representatives from the U.S. Office of Education. The data sets that emerged from having to make sense of the work requirements within projects were shaped in a much different way, and by different forces. These data sets were shaped by the conceptual framework that guided the empirical thrust of the Oregon Studies, and by the interaction of that framework with that which was encountered in the course of describing ongoing projects in the field. In this sense the data sets describing the work requirements within projects were grounded empirically as well as conceptually. This is not to imply that these data sets were not influenced by persons in the field. They were. The conceptual framework from which they emerged was reviewed on numerous occasions by the same review and advisory body that shaped the other data sets used in the Studies. The influence of these groups on the shape that these data sets took, however, was much less direct.[1]

Four sets of variables were specified by the conceptual framework as critical to understanding the work requirements of projects: (a) the outputs of work effort; (b) the standards held for outputs; (c) the operations required to produce specified outputs to specified standards; and (d) the knowledges, skills and sensitivities required to carry out those operations. In attempting to describe the outputs of projects, and the standards, operations and enablers that related to them, it was necessary to establish a number of category sets to handle the complexity that was found. Two approaches were taken to the development of these sets, a conceptual-empirical (deductive) approach, and an empirical-conceptual (inductive) approach. In the former, category sets were developed as an extension of the conceptual framework that guided the Studies; in the latter, they were developed in response to the data emerging from the study of ongoing projects.[2] Operationally, however, the two approaches were complementary, for the conceptual-empirical approach yielded category sets that functioned as relatively broad, general organizers of the data, and the empirical-conceptual approach yielded category sets that functioned at a "close to the source," descriptive level.

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[1] For a description of the conceptual framework that guided the empirical thrust of the Studies see Schalock, H. D. and Sell, G. R., "A Framework for the Analysis and Empirical Investigation of Educational RDD&E," in Chapter 4 of Volume III of the series of volumes reporting the Studies.

[2] To some extent this is an over simplification, for the conceptually derived categories were tested empirically in the course of their derivation (see Chapter 2 of the present volume), and the empirically derived categories were always influenced by conceptual considerations.

Conceptually derived category sets. Figure 4.1 provides a summary of the data sets used to organize the descriptive information about project outputs, standards, operations and enablers at a broad, conceptual level.

	OUTPUTS	STANDARDS	OPERATIONS	ENABLERS
STRUCTURE	Products Events Conditions	Product Process		Knowledge Skill Sensitivity
FUNCTION	Policy Setting Management Production			
CHARACTER	Knowledge Technology Implementation Information			
LEVEL	Focal Component Facilitory		Activities Tasks* Actions	

FIG. 4.1. Category sets used to describe at a broad, conceptual level the properties of outputs, standards, operations, and enablers.

* Of the operations set, only task level descriptions were obtained. Time and resources did not permit an analysis of operations at the level of actions, and the activities set was left to be derived empirically. From this point forward in the text, the term "task" will be substituted for the term "operations."

Two observations about Figure 4.1 are in order. First, the data sets are uneven. Multiple sets exist for the coding of outputs, but only single sets--and those not of a comparable nature--exist for the coding of standards, operations, and enablers. In part this uneveness reflects the special role played by outputs in describing projects. The analysis of project work requirements always started with the identification of the outputs toward which work was directed. Since the adequacy of this identification determined the adequacy of all that followed, a great deal of care was given the task of output classification. As a consequence outputs received more attention conceptually over the course of the Studies than did the variables that linked them. A greater degree of differentiation was the result. In part, however, the uneveness reflected in the category sets appearing in Figure 4.1 is a result of the discovery of unsuspected properties of outputs, the inappropriateness of some initially proposed sets for operations, and the decision midway in the course of the Studies to withhold further taxonomic efforts on standards, operations and enablers until those efforts could make use of the full data base being established by the Studies. It is probable, therefore, that the uneveness observed in the sets is more likely a reflection of an uncompleted conceptual task than it is of the natural order of things.

The second observation appropriate to Figure 4.1 is that the labels given the various category sets are arbitrary. They are simply labels that have functioned heuristically in identifying sources of variation observed in outputs, standards, tasks, and enablers during the course of project description. Whether they are the best labels available for the constructs they identify, or whether they even appropriately identify the constructs intended, is an open question. They represent a "first cut" at identifying and ordering the internal dimensions of RDD&E projects, however, and, given the descriptive data on the nature of these variables that are now available, provide a good base for subsequent conceptual development.

Arbitrary as they may be, the category sets that appear in Figure 4.1 constitute the broad organizing categories into which all descriptors of project outputs, standards, tasks, and enablers have been coded. The meanings they carry, therefore, must be understood if the data reported in subsequent chapters are to be understood. Toward that end definitions and examples are provided in Table 4.1 for the categories appearing in Figure 4.1.

Empirically derived category sets. While the conceptually derived category sets provided the broad, organizing framework for data collection and analysis relative to work requirements within projects, the empirically derived sets provided the substantive framework. These were the sets that took their form and content from the language of persons working inside projects.

Procedurally, the empirically derived category sets emerged in the following way. As outputs were identified, and the standards, tasks, and enablers pertaining to those outputs explicated, they were assigned a classificatory label. These labels, called primary categories, were extremely "close to the source" for they were essentially refinements of the words used by interviewees to describe the outputs, standards, operations, and enablers embedded in the projects being studied. The category sets grew by referencing each interviewee description, as it entered the pool of output, standard, task, and enabler descriptions, against the set of primary categories that existed at that point in time. If the incoming descriptive statement could be classified in an existing primary category, it was; if it could not, a new category was created to accommodate it. Through this process 326 primary categories of outputs, 79 primary categories of standards, 230 primary categories of tasks, and 137 primary categories of enablers were identified. These sets housed, respectively, 962 descriptors of project outputs, 1148 descriptors of output standards, 3722 descriptors of output related tasks, and 2497 descriptors of output related enablers. Examples

TABLE 4.1

Definitions and Illustrations of the Conceptually Derived Category Sets that Describe the Characteristics of Outputs, Standards, Operations and Enablers

Category Set	Subsets	Definitions	Examples
		OUTPUTS	
STRUCTURE refering to Outputs . . . the properties of outputs that permit them to be identified as PRODUCTS, EVENTS, OR CONDITIONS	Product	A tangible or "hard outcome of work effort, concrete in form, and transportable at a given point in time	Task chart; single concept film
	Event	An outcome or work effort that results in the occurrence of an observable transaction or set of behaviors.	Staff meeting; workshop; speech
	Condition	An outcome of work effort that creates a desired circumstance expected to endure within the life of a project, or beyond the project as a result of it.	Staff welfare; parent involvement
FUNCTION refering to Outputs . . . the properties of outputs that permit their uses to be identified as serving the purposes of POLICY SETTING, MANAGEMENT, or PRODUCTION	Policy Setting	A classification given an output that establishes the principles or guidelines to be attended by a project.	Policy plans; conceptual leadership
	Management	A classification given an output that orchestrates the resources (time, personnel, materials, space, information) available to a project in the realization of the outcomes expected from it; also a report of that orchestration.	Interim report; budget; staff meeting
	Production	A classification given an output which builds directly on the fabrication objectives of a project.	Single concept film; film typescripts
CHARACTER refering to Outputs . . . the properties of outputs that permit them to be identified as instances of KNOWLEDGE, TECHNOLOGY, IMPLEMENTATION, or INFORMATION	Knowledge	A classification given an output of RESEARCH, i.e., an instance of a generalizable idea newly inferred from factor data and which can stand the test of empirical verification.	Theory paper, interpreted data; nature of reading
	Technology	A classification given an output of DEVELOPMENT, i.e., an instance of a reliable strategy, procedure, hardward, or set of materials designed to bring about a particular outcome or perform a defined operation.	Observation technique; typescript
	Implementation	A classification given an output of DIFFUSION, i.e., an instance of the ADOPTION and UTILIZATION of KNOWLEDGE, INFORMATION, and/or TECHNOLOGY.	Journal article; Sesame Street puppets; speech
	Information	A classification given an output of EVALUATION, i.e., an instance of trustworthy facts or data without reference to interpretive or value judgments relating to that description.	Progress report; appeal data; literature survey

LEVEL refering to Outputs . . . the properties of outputs that permit their relationship to project goals to be identified as FOCAL, COMPONENT, or FACILITATING	Focal	An outcome of work effort expected by contractual obligation to emerge from a project.	Final report, informed public
	Component	An outcome of work effort that constitues an element of, or an approximation to, a FOCAL OUTPUT.	Content map; student analysis form
	Facilitating	An outcome of work effort that makes easier or assists in the generation of FOCAL or COMPONENT OUTPUTS, but is not in itself a part of such outputs.	Writing style manual; data analysis; staff meeting

STANDARDS

STRUCTURE refering to Standards . . . the properties of judgments about adequacy that permit them to be linked to OUTPUTS or PROCESSES	Output Standard	A criterion applied to, or level of excellence expected of, an output; a criterion by which the adequacy of an output is judged.	Performs consistently; acceptance by sponsor
	Process/operation Standard	A criterion applied to, or level of excellence expected of, the processes/operations engaged in producing an output; a criterion by which the adequacy of processes/operations are judged.	Deadlines are met; feedback occurs; project view accepted

OPERATIONS

LEVEL refering to Operations . . the properties of directed work efforts that permit them to be identified as ACTIVITIES, TASKS, or ACTIONS	Activities	Not represented in the data	
	Tasks	A discrete unit of work performed among other similarly targeted units in producing a specific output to the standards set for it.	Design format for report; compile data; determine information needed
	Actions	Not represented in the data	

ENABLERS

STRUCTURE refering to Enablers . . . the properties of prerequisite or enabling conditions that permit them to be identified as KNOWLEDGE, SKILL, or SENSITIVITY	Knowledge	A classification given an ENABLER that identifies it as an instance of that which is to be known as a requisite to the accomplishment of an output.	Knowledge of: statistics; data needed; learning theory
	Skill	A classification given an ENABLER that identifies it as an instance of a specific ability considered requisite to the accomplishment of an output.	Skill in: programming events; handling detail
	Sensitivity	A classification given an ENABLER that identifies it as an instance of a specific perceptiveness and responsiveness considered requisite to accomplishment of an output	Sensitivity to: user feedback; need for recognition; respect for staff

of the primary categories used in classifying outputs, standards, tasks, and enablers, and examples of the descriptive statements that have been coded within them, appear in Table 4.2.

Because of the large number of primary categories that emerged in the process of classifying outputs and tasks, a higher order set of categories had to be created in order to simplify data handling. The creation of these higher order sets involved grouping or clustering, and then labeling, the primary categories in much the same way that the creation of the primary categories involved the grouping and labeling of interviewee descriptions. During the course of the Studies 51 categories describing "clusters" of outputs, and 20 categories describing "clusters" of tasks emerged. Examples of the cluster categories used in classifying outputs and tasks, and the primary categories that rest within them, are presented in Table 4.3. All of the primary and cluster category sets used for coding purposes within the Oregon Studies, as well as the frequency with which each was used within the research, development, diffusion, and evaluation projects studied, are presented in Appendices 1 through 9. The descriptive statements contained within the primary category sets appear as appendices within the case profiles reported in Volume IV of the series reporting the Oregon Studies.

The Interdependence of Data Sets

As indicated previously, each case profile that was to emerge from the Oregon Studies was to reflect the "essence" of the project being described, and the "realities" of working within it. Operationally, that was translated to mean that each case profile was to describe not only the variables listed in the preceding paragraphs, but their interrelationships as well. It was also translated to mean that a way had to be found to collect data on such interdependencies, for unless they were sought in the field they could never be reported in the profiles.

Accordingly, the data collection methodology developed within the Studies permitted context, people, and work requirement data to be collected as interdependent data sets. In keeping with the conceptual framework that guided the methodology, outputs of work effort were adopted as the primary unit of analysis within projects. Procedurally, once an output of work effort had been identified it was possible to link to that output the standards set for its production, the operations required for its production, the enabling knowledges, skills and sensitivities needed for its production, the persons involved in its production, and the relationship of that output and the work associated with it to the other outputs involved in the work of a project as a whole. It was also possible to link a particular output to the organizational structure of a project, the context within which the project rested, and even the "dynamics" of a project, though not so directly as in the case of variables that depended upon output linkage for their definition.

The interaction or interdependencies of these various data sets are illustrated schematically in Figures 4.2, 4.3, and 4.4. Figure 4.2 is

TABLE 4.2

Examples of Primary Categories of Outputs, Standards, Tasks, and Enablers, and the Descriptive Statements Coded Within Them

Primary Categories	Descriptive Statements
OF OUTPUT	
Baseline data	School records data; Analysis of baseline data from schools
Selection of Personnel	Staff hiring; Procure staff for cable TB operation; Staffing for viewing cntr.
Adequate staff	Selected and trained staff; Providing and maintaining adequate research staff
OF STANDARDS	
Appropriate design/content	Response dealt with argument..., did not ramble; Few shifts...required
Lack of errors/discrepancies	Reports are statistically accurate; Category sets...are totally inclusive
Acceptable level of output	Staff performs work in acceptable manner; One child tested per tester per day
OF TASKS	
Make vacancies known	Solicit referrals from colleagues and peers; Publicize need for subcontractor
Visualize/specify format	Decide...evaluation format with staff; Design experiment from knowledge of research design
Record/classify raw data	Identify tests with child ID number and name; Fill out coded sheets from tape
OF ENABLERS	
Char's of target audience (K)	Knowledge of: Different dialects spoken...; Degree of audience sophistication
Finding fits/integrating (Sk)	Skill in: Identifying relevant variables...; Fitting together...report pieces
Capabilities/limitations (S)	Sensitivity to: Age level, capability of kids; Attention/work span of people

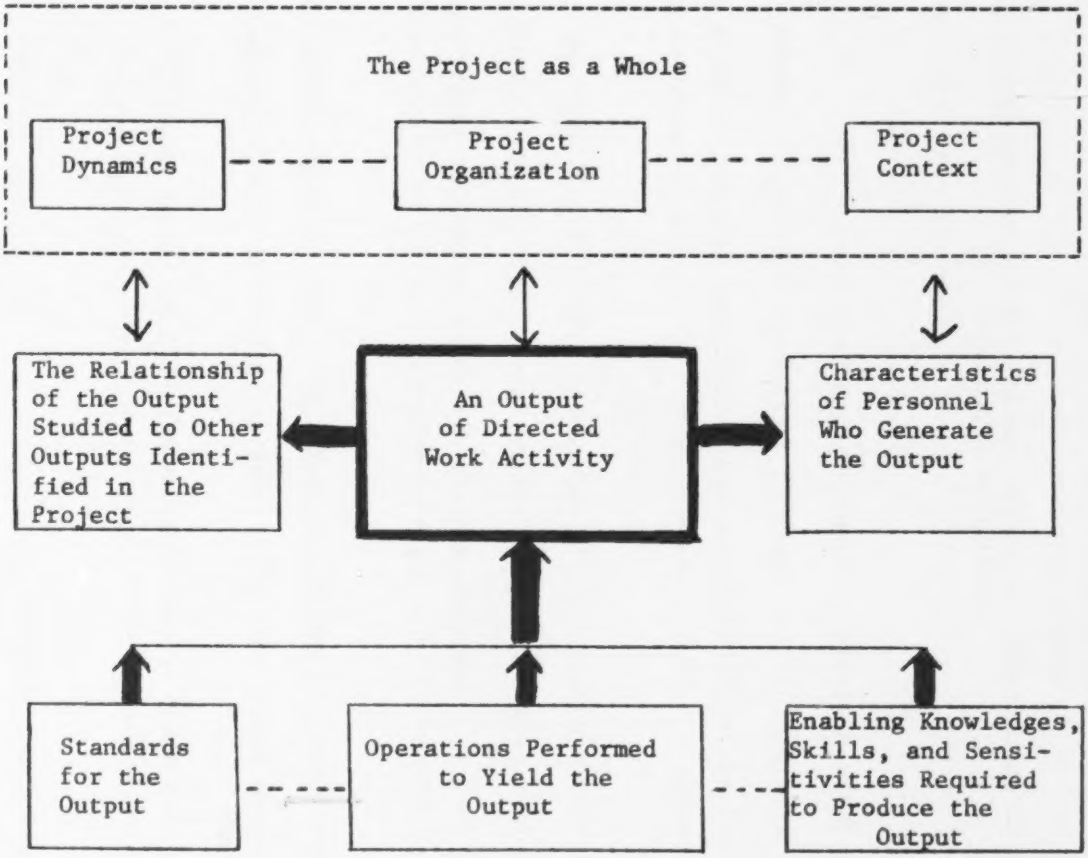
The Project as a Whole
Project Dynamics
Project Organization
Project Context
The Relationship of the Output Studied to Other Outputs Identified in the Project
An Output of Directed Work Activity
Characteristics of Personnel Who Generate the Output
Standards for the Output
Operations Performed to Yield the Output
Enabling Knowledges, Skills, and Sensitivities Required to Produce the Output

FIG. 4.2. The classes of information sought in describing a project, and their interdependencies.

of output-work requirement data. The reader is invited to study this latter figure carefully, for it represents the basic organizational framework followed in collecting and reporting the core data within the Oregon Studies.

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intended to illustrate the strength of the interdependencies between data sets, i.e., the extent to which they were linked during the course of data collection, (the heaviness of line in the figure is intended to indicate strength of dependency), and Figure 4.3 is intended to illustrate the manner in which the nested relationship between context, people, and work requirement data is treated within a case profile. Figure 4.4 illustrates the detailed linkages that exist between the various classes

Table 4.3. Examples of Cluster Categories of Outputs and Tasks, and the Primary Categories Coded Within Them

Cluster Categories	Primary Categories
OUTPUTS	
Reports/Contracts	Terminal report Proposal Evaluation report Progress report
Work Specifications/ Procedures	Description/Specifications for Output Data analysis procedures Data Collection procedures
TASKS	
Clarifying Problem Addressed	Specify context/scope/limits of effort Observe relevant/related field operations Review of/Familiarization with materials Identify characteristics of target population
Effecting Accountability	Establish/Maintain time lines Develop record keeping system Estimate/Provide material/ personnel Specify/Establish/Adopt policies

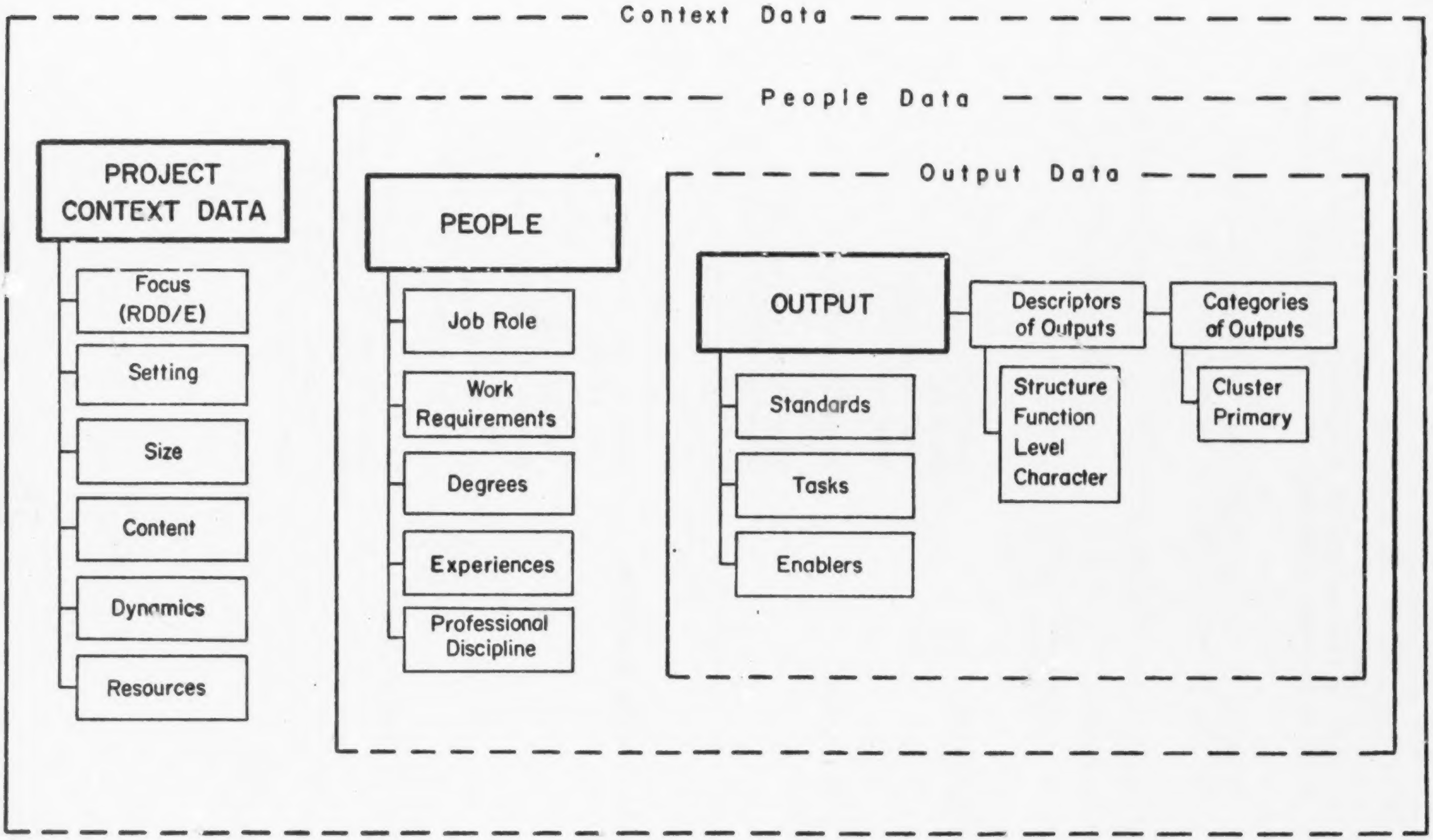
Context Data
People Data
Output Data
PROJECT CONTEXT DATA
Focus (RDD/E)
Setting
Size
Content
Dynamics
Resources
PEOPLE
Job Role
Work Requirements
Degrees
Experiences
Professional Discipline
OUTPUT
Standards
Tasks
Enablers
Descriptors of Outputs
Structure
Function
Level
Character
Categories of Outputs
Cluster
Primary

FIG. 4.3. The nature of the interdependent relationships of the data sets.

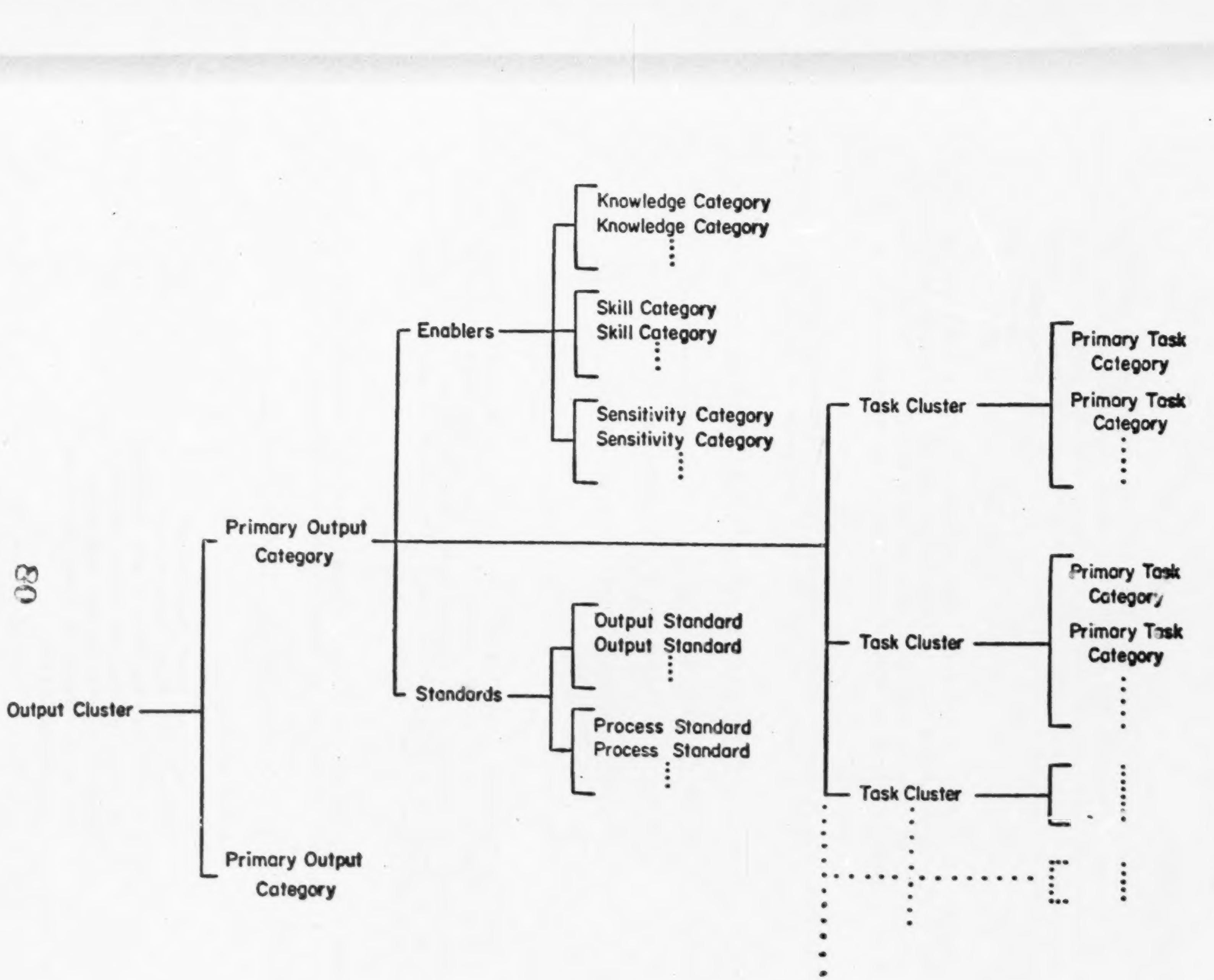
Output Cluster
Primary Output Category
Primary Output Category
Enablers
Standards
Knowledge Category
Knowledge Category
Skill Category
Skill Category
Sensitivity Category
Sensitivity Category
Output Standard
Output Standard
Process Standard
Process Standard
Task Cluster
Task Cluster
Task Cluster
Primary Task Category
Primary Task Category
Primary Task Category
Primary Task Category

FIG. 4.4. The linkage of data sets used to describe output-work requirement interaction.

A Numbers Game

Previous paragraphs have shown that the data collected in the Oregon Studies for use in mapping the structure of educational RDD&E projects ranges widely in terms of its source, its focus, and its level of detail. The implications of this variability for purposes of analysis is discussed in subsequent chapters. The purpose of the next few paragraphs is to present in summary form the units of data available from the analysis of the 20 projects, and the frequency counts that exist for each.

Tables 4.4 through 4.7 provide such summaries. Table 4.4 contains a listing of the variables used in describing general project parameters, and the number of observations available in each variable. In all cases the N for these variables is equal to the number of projects analyzed (20).

TABLE 4.4. Variables Describing General Project Characteristics, and the Number of Observations Available on Each

Class of Data	N
Objectives, rationale, and significance	20
Time lines and task charts	20
Project, program and institutional context	20
Project dynamics	20

Table 4.5 contains a listing of the variables used in describing the characteristics of personnel employed in the 20 projects analyzed, and the number of observations available on each variable. The N in the case of these data varies according to the number of persons completing a particular questionnaire.

TABLE 4.5. Variables Describing General Personnel Characteristics, and the Number of Observations Available on Each

Class of Data	N
Professional Staff Represented	307
Professional Staff Interviewed	134
Professional Experience and Training	115
Job Descriptions and Prerequisites	115
Supporting Services and Resources	115
Work Requirements in Relation to Job Responsibilities	90

Of the 134 professional staff interviewed, 115 completed the questionnaire that focused upon personnel characteristics generally, and 90 of those 134 completed the questionnaire that focused upon work requirements. It will be recalled from earlier discussion that the variables listed in both Tables 4.4 and 4.5 are variables that emerged from the demands of the case study methodology, rather than from the conceptual framework that guided the empirical thrust of the project generally.

Tables 4.6 and 4.7 contain, respectively, a listing of the empirically derived and conceptually derived categories descriptive of work requirements within projects that followed from the conceptual framework that guided the Studies. Table 4.6 contains essentially a repeat of information provided earlier, though in the previous discussion the data were not tabled and no mention was made of the number of outputs analyzed--a critical matter since all data reported on standards, tasks and enablers are directly linked to those outputs. Table 4.7 simply reports the distribution of the descriptor data reported in Table 4.6 when it is ordered according to the conceptually derived category sets that serve as broad organizers for the descriptor data. It is critical to realize that the numbers reported for both Primary and Cluster Category sets in Table 4.6 refer to numbers of categories in a particular category set, not frequency counts within categories.

TABLE 4.6. Empirically Derived Categories Describing Work Requirements Within Projects Available, and the Number of Observations on Each

	Outputs Identified	Outputs Analyzed	Standards	Tasks	Enablers
Descriptors	962	298	1148	3722	2497
Primary Categories	326	167	79	280	137
Cluster Categories	51	46		20	

TABLE 4.7. Conceptually Derived Categories Describing the Characteristics of Outputs and Associated Work Requirements Within Projects, and the Number of Observations Available on Each*

Characteristics of Outputs (N=962)	Outputs		Characteristics of Associated Work Requirements		
	Identified	Analyzed	STANDARDS	OPERATIONS	ENABLERS
STRUCTURE					
Products	759	182	Output 775		Knowledges 964
Events	130	65	Process 373		Skills 848
Conditions	73	51			Sensitivities 685
FUNCTION					
Policy Setting	26	12			
Management	514	174			
Production	422	112			
CHARACTER					
Knowledge	40	18			
Technology	576	178			
Implementation	136	55			
Information	210	47			
LEVEL					
Focal	134	44			
Component	217	53		Tasks 3722	
Facilitory	611	201			

* The numbers reported in the table pertain to the numbers of descriptive statements coded within the various categories listed. The distinction between outputs identified and outputs analyzed is critical in this regard as all standards, operations and enablers are linked to the latter set of outputs.

Data Collection Procedures

Three relatively distinct procedures were cimplyed in collecting data on the general characteristics of projects, personnel working within projects, and work requirements within projects. All data, however, were collected within the context of an "on-site" visit by a data collection team from the Oregon Studies. Depending upon the size and complexity of a project, teams varied in size from two to six people, and the length of the site visit extended from three to five days. Data collection procedures and decision rules are described in detail in Volume V of the series of volumes reporting the Oregon Studies. In the paragrpahs that follow an overview of the procedures used to collect the various classes of data pursued in the project is provided.

General Project Descriptors

Probably the best label for the procedures used in collecting data on general project descriptors is that of "non-obtrusive." The objectives of a project, the rationale for a project, project time lines, organizational structures, and the like, were obtained from project proposals and other documents descriptive of the project. Also, information on the "dynamics" of the projects were gathered through incidental observation, the recall of causal comments made by project staff while being interviewed, and the "hunches" or "insights" gained while working with project data. Almost without exception these sets of data were collected without intrusion upon people's time and energy.

The one data set used to describe the general characteristics of projects that was intrusive was the data set that described the context within which the project rested. Some information of this kind was obtained from proposals and other documents, but in all cases project directors were interviewed when developing a context map. In some instances context mapping amounted to little more than confirmation of information gained elsewhere, but in others it involved both the generation and piecing together of information about intra- and inter-institutional linkages that were simply not made explicit in existing materials. Generally speaking, the larger the project the more complex its political-institutional-intellectual linkages, and in some cases, for example, the Children's Television Workshop, the development of a map to depict these linkages was a major undertaking.

Personnel Descriptors

All of the data descriptive of the personnel of educational RDD&E were collected through questionnaires administered by members of the Oregon Studies staff, either while visiting the project site or through telephone conversations. Three questionnaires were used: a) a general project questionnaire; b) a job/task inventory; and c) a general activities questionnaire (which serves as a second source of work requirement data). The data derived from the three questionnaires are referred to in the data bank, respectively, as Forms 02, 03, and 04 data. Copies of the three questionnaires may be found in Volume V in the series of volumes reporting the Oregon Studies.

Procedurally, the general project questionnaire was administered differently than either the job/task inventory or the general activities questionnaire. This was a function of the different purposes served by the data from the different questionnaires. By and large the general project questionnaire was used for purposes of decision making relative to the inclusion or exclusion of a particular project in the sample of projects to be described in the Oregon Studies. Given this purpose, the Form 02 questionnaire was completed prior to the project site visit. A number of the items in the questionnaire were completed at the time that a member of the Oregon Studies staff first contacted the project director by telephone relative to participation in the Studies. During the initial site visit to the project, which was designed to make firm a project inclusion-exclusion decision, the project questionnaire was either completed, or, if the project was to become a participant in the Oregon Studies, it was left to be completed by the project director prior to the on-site visit by the data collection team. The questionnaire sought such information as the official project title, starting and ending dates for the project, the nature of the organization within which the project rested, funding sources for the project, total funds available to the project, the number and kind of personnel associated with the project, and bibliographic references to any published or nonpublished documents emerging from the project.

The job task inventory (Form 03) and the general activities questionnaire (Form 04) were administered by members of the data collection team while on site by means of a standard procedure. The on-site visitation by the data collection team called for a meeting of all staff in the project during the first morning of the site visit. At this meeting the nature of the activities and procedures to be followed by the data collection staff while on site were outlined, the nature of the demands that would be placed upon project staff for purposes of data collection were discussed, etc. Typically at the end of this general orientation and discussion period, each staff member was given copies of the Form 03 and Form 04 questionnaires and asked to have them filled out by the time of the data collection interview. Both questionnaires were picked up at the time of that interview, or at least by the time the staff left the project site. Of the 134 staff that were interviewed 115 completed the job/task inventory (Form 03) and 90 completed the general activities questionnaire (Form 04). The substantive focus of the job/task inventory was threefold: professional experience and training, job description and prerequisites, and supporting services and resources available to personnel on the project. The focus of the general activity questionnaire was, as its title indicates, the activities performed in relation to job responsibilities within the project.

Work Requirement Descriptors

All data on outputs and on the work related to their production were collected through interview. The interview strategy called for: (a) identifying outputs associated with a project (an output index); (b) ordering those outputs according to their interdependencies (an output map); (c) selecting from the map those outputs for which work requirement data were to be obtained; (d) identifying persons most directly responsible for and/or most directly involved in the production of those outputs; and (e) interviewing those persons in relation to the standards held for the output being analyzed, the tasks required to produce the output, and the knowledges, skills, and sensitivities needed to perform the required tasks. The selection of outputs to be analyzed was done by the data collection team, on site, after an output map had been established and a sense had been gained as to the outputs that were most critical to the project. Persons interviewed provided information relative to their own contribution to the production of a particular output, as well as to the contributions of others (a distinction between self-other data was maintained throughout the project.) As familiarity with a project grew, adjustments were made as needed in the output map, the selection of outputs to be interviewed around, and the matching of interviewees with outputs. All interviews were tape recorded, and all data were reduced from the recordings by the person who did the interviewing.

The reduction of the interview data involved a multistep process: (a) editing tapes to identify data statements within them, that is, statements pertaining to standards, tasks, and enablers; (b) the recapitulation, or "recapping", of data statements into a readable, grammatically correct form, that is, independent clauses and/or sentences (care was taken not to destroy the original language of the interviewees in this process); (c) the transfer of the recapped statements to color-coded summary sheets that corresponded to the various data sets being used; (d) the coding of the recapped statements by a two person coding resolution team (during this process the coding team was free to call upon members of the data collection team for statement clarification, interpretation, context building, etc.); and (e) the storage of the coded data in computer files in a way that permitted the interdependencies within the data to be maintained. A record of all steps in the data collection and reduction process was maintained from the time of first contact with a project until all data on that project had been computer stored and verified.

The Trustworthiness of the Data

Since the classes of data reported in the profiles were collected by various means, each must be considered separately as to its trustworthiness. Accordingly, the potential sources of error that reside within each data class, and the steps taken to control them, are reviewed in the paragraphs that follow.

General Project Descriptors

Four of the five data sets used to describe the general characteristics of projects made use of working documents. These included project objectives, time lines, organizational structures, and context maps. Typically, the document used had been prepared by project directors. To the extent that such documents can be accepted at face value, and to the extent that the Oregon Studies staff did not introduce error in reporting the substance of those documents, the data sets that made use of them were subject to few sources of error. As a consequence, no formal measures of trustworthiness were prepared for them.

Judgments relative to the trustworthiness of the data reported on project dynamics is another matter. It will be recalled that these data consist of the pooled observations, hunches, "insights," and choice tidbits of information gleaned by members of the data collection team from a wide variety of sources. It will also be recalled that these data intentionally were to be subjective and impressionistic. As a means of reducing gross error all final descriptions of the dynamics of projects were read and confirmed by all members of the data collection team that visited a project, but no formal measures as to the trustworthiness of such data were obtained. For purposes of profile presentation, however, the data on project dynamics are reported. The project directors of the last five projects visited were asked to rate and comment on the representativeness of various aspects of the profiles. Four project directors indicated the profiles represented a "majority of the operational concerns."

Personnel and Work Activity Descriptors

Since the data sets describing personnel and work activities were derived through questionnaire methodology they were subject to the various sources of error known to operate within that methodology, for example, the error that is introduced through the selection of questions asked, the possibility of multiple interpretations of those questions, and the lack of opportunity to determine falsification or shoddiness of response to the questions. The steps taken to control these sources of error were of two kinds: (a) reasonable care in the development and testing of the questionnaires prior to their utilization for purposes of data collection; and (b) the administration of the questionnaires while the data collection team was on site. The first step involved a number of field trials of the questionnaires, and a number of revisions in them on the basis of those trials. The second allowed the questionnaires to be introduced within the context of the data collection effort as a whole, and provided within that context an opportunity to clairfy troublesome questions about or within them. In combination, it is believed that these procedures sufficiently reduced the typical sources of error that enter the collection of questionnaire data such that the data reported can be viewed with a high degree of confidence.

Output and Work Requirement Descriptors

Just as the personnel and work activity data were subject to the errors typically associated with use of questionnaires, the output and work requirement data, which were collected through interviews, were subject to the errors typically associated with interviews. Four sources of error have commonly been troublesome in this regard: (a) the selection of interviewees as data sources; (b) the information elicited from interviewees about work requirements; (c) the coding of the information obtained from interviewees; and (d) the storage, retrieval, and analysis procedures used in manipulating the coded data.[3] The procedures followed in the Oregon Studies to combat these sources of error are summarized as follows:

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[3] When the pr files are being considered as a data base for cross-project analyses, other sources of error must be considered. Two critical sources are (a) the adequacy of the sample of projects drawn and (b) the adequacy of the sample of outputs selected or analysis within a given project. (Cont'd.)

- Interviewee Selection

  Only staff intimately acquainted with or involved in the production of an output were selected for interview. The relationship of the interviewee to an output was always confirmed by the project director, the person to be interviewed, and the immediate supervisor of that person. Data reported by an interviewee on the work of others in relation to an output were noted and coded separately.

- Data Generation

  A structured interview procedure was used to obtain data on the standards, tasks, and enablers associated with a particular output. In the interview, standards were the first to be identified, followed by the tasks engaged in to produce the output to those standards, followed by the knowledges, skills and sensitivities drawn upon in carrying out the tasks identified. Stylistic variations in interviewing were permitted so as to accommodate either interviewer or interviewee differences, but during the course of an interview all data sets were exhausted. (For a detailed discussion of interview procedures see Volume V of the series of volumes reporting the Oregon Studies).

- Data Reduction

  A carefully established set of procedures and decision rules were followed in "recapping" the interviewee statements, and in coding the recapped statements in terms of appropriate data sets. The recapped statements were first checked for their completeness and adequacy by the coordinator of data handling upon the return of the data collection team from a project site. They were checked again by the coding resolution team. Incompleteness, or error, or lack of clarity detected on either of these checks required that the recapped statements be revised until they were acceptable at both quality assurance checkpoints. To insure reliable coding, team coder agreements were calculated. Using the recapped statements in three case profiles as a base for calculating coder reliability, and separating first and second codings by a three month period, coding agreements for items in each data set, with one exception, ranged between .55 and 1.00. Detailed coder reliability data are reported in Table 4.8.

These are sources of error that relate to the generalizability of data, however, and are not of primary concern in considering the case profiles as descriptions of individual projects.

TABLE 4.8. Coder Agreements on a Sample of Three Projects, With a Period of Three Months Separating First and Second Codings*

Category Symbol	Category Label	After Analyzing 5 Projects		After Analyzing 20 Projects			
		Project #1		Project #12		Project #13	
		N	% Agreement	N	% Agreement	N	% Agreement
A	Structure of Outputs	20	95.0%	15	93.3%	18	100.0%
a	Function of Outputs	Not in the System		15	86.7	18	83.3
B	Level of Outputs	Not in the System		15	71.4	18	100.0
C	Character of Outputs	20	95.0	15	93.3	18	100.0
Z	Character of the Focal Output to Which Other Outputs Are Linked	Not in the System		15	80.0	18	100.0
DE	Clusters of Outputs	Not in the System		15	80.0	18	88.8
FGHI	Primary Categories of Outputs	20	90.0	15	80.0	18	60.1
J	Structure of Standards	20	90.0	37	100.0	15	86.6
LM	Primary Categories of Standards	20	65.0	37	70.3	15	86.6
NO	Cluster of Tasks	23	82.6	135	79.0	50	80.0
QR	Primary Categories of Tasks	23	52.2	135	54.8	50	72.0
S	Structure of Enablers	38	92.1	114	100.0	35	100.0
UV	Primary Categories of Enablers	38	65.8	114	69.3	35	77.3

* All coding in the Studies was carried out by a two man team. Each member of the team coded all items independently, compared codings, and then resolved differences when differences occurred by reference to the taped interview, discussion with the interviewer, etc. The reliability data reported are for coding agreements reached by the team.

Data Storage and Retrieval

As soon as the recapped statements had been coded for a particular project the codes were forwarded for transfer into computer storage. After storage, repeated checks were run to insure that the initial computer entries were correct, and the computer center manipulations over time had not destroyed or reordered the data as it was originally stored.

In view of the data that have been presented on the reliability of coding, and the precautions that were taken throughout the data collection effort in instrumentation, collection, and reduction, the data reported in this and other volumes can be viewed with a reasonable degree of confidence.

The Organization of the Data

Four organizing frameworks have been used in presenting the data collected in the Oregon Studies: a) projects; b) the focus of projects; c) the outputs of projects; and d) selected issues. The rationale for organizing the data according to these frameworks an overview of the data presented within them, and directions as to where the data so ordered are to be found are provided in the paragraphs which follow.

The Organization of the Data By Projects

The organization of the data by projects meets the contractual obligation of the Oregon Studies to present the data collected in case study form. Accordingly, "case profiles" are presented for each of the 20 projects studied. All data collected on each project are integrated and presented within the profile of that project. In the exploration and mapping language adopted for reporting the work of the Oregon Studies, the case profiles are presented as detailed "site" maps. As such, the profiles collectively constitute one of the primary data outputs of the Oregon Studies.

The profiles are reported in Volume IV in the series of volumes reporting the Oregon Studies. Part One of Volume IV contains five profiles that describe research projects and three that describe evaluation projects; Part Two of the Volume contains seven profiles that describe development projects; and Part Three of the Volume contains five profiles that describe diffusion projects. The rationale for the development of detailed case profiles of ongoing RDD&E projects in education at this point in time has been reviewed in Chapter 1 of the present volume. A description of the content and organization of the profiles appears in the following chapter.

The Organization of the Data By Focus

The organization of the data by project focus meets the contractual obligation of the Oregon Studies to "map the domain" of educational RDD&E. Three major classes of data have been attended to in this mapping process: a) descriptors of project personnel; b) descriptors of project outputs; and c) descriptors of work requirements associated with the production of project outputs. In all three cases the data are reported in terms of the range of phenomena observed within the total sample of projects studied, and the similarities and differences in the distribution of those phenomena when ordered according to the focus of the projects studied, that is, when ordered according to RDD&E. In the exploration and mapping language adopted for reporting the work of the Oregon Studies, these data are presented as preliminary or "outline" maps of the domain as a whole. These would seem to be appropriate labels for such a mapping effort for they are based upon a relatively small project sample (20) and an unequal distribution of projects by RDD&E within the sample.[4]

The data ordered by project focus are reported in Chapters 6, 7, 8, and the appendices of the present volume. Chapter 6 contains the data on personnel associated with educational RDD&E activities; Chapter 7 contains the data on the nature of the outputs that emerge from educational RDD&E activities; and Chapter 8 contains the data on the standards set for those outputs, the tasks involved in their production, and the knowledges, skills, and sensitivities that are drawn upon in producing them. The full range of outputs, standards, tasks and enablers observed in the 20 projects studied appear in the appendices. Each class of data reported in Chapters 6, 7, and 8 are reported as if they were independent sets; they are reported as linked sets in Chapters 9, 10 and 11.

The Organization of the Data By Outputs

The organization of the data by outputs meets the contractual obligation of the Oregon Studies to "identify the competencies needed by staff to carry out the operations involved in educational RDD&E projects, the indicators acceptable as evidence of the existence of such competencies, and the knowledges, skills, and sensitivities prerequisite to their demonstration". Three sets of data are presented in this regard: a) data on outputs *per se*; b) data that link standards, tasks, and enabling knowledges, skills, and sensitivities separately to outputs; and c) data that links standards, tasks, and enablers collectively to outputs.

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[4] As pointed out elsewhere, the data base provided by the Oregon Studies for describing the range of personnel, outputs and work requirements that appear within the domain of educational RDD&E is reasonably strong, whereas the data base provided by these Studies for the analysis of similarities and differences between educational RDD&E projects is relatively weak. At best, the similarities and differences data can be only suggestive. Preferably, it should be treated as a source of hypotheses to be tested in subsequent studies.

In the exploration and mapping language adopted for reporting the work of the Oregon Studies, these data are presented as "suggested detail maps". This would seem to be an appropriate label for such a mapping effort for it is based on a relatively large sample of outputs (962 identified; 298 analyzed for their work requirements), and work requirement data are reported only for those outputs that appeared most frequently within the projects studied.[5]

As indicated above, the data ordered by outputs are reported in Chapters 9, 10 and 11 in the present volume. Chapter 9 contains the data reported on outputs per se; Chapter 10 contains the separately linked output - standards data, output - task data, and output - enabler data; and Chapter 11 contains illustrations of all three classes of work requirement data linked to a single output. The concept of an "output tree", as illustrated in Chapter 11, is seen as being the most powerful organizing framework for reporting work requirement data that is presently available. It is presented in Chapter 11 as an illustration because in actual operation an output tree represents only a collective reporting of the data summarized separately in Chapter 10.

The Organization of the Data By Selected Issues

The organization of the data by selected issues meets the responsibility of the Oregon Studies to determine the extent to which the factors of project size and setting (the two factors used in selecting projects for study, in addition to project focus) account for variability in the data, and the responsibility to apply the data base established in the Studies to questions of high interest to trainers and others responsible for the conduct of educational RDD&E. Accordingly, four additional analyses of the data are presented: a) an analysis of the variability associated with project size; b) an analysis of variability associated with project setting; c) an analysis of variability associated with job role; d) an analysis of variability associated with output - work requirement data and job role; and e) an explanation of the variety of combinations of the data sets that are possible. In the exploration and mapping language adopted for reporting the work of the Oregon Studies, these data are presented as "special purpose" maps. All special purpose maps are presented in Chapter 12 of the present volume.

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[5] All work requirement data were collected, coded and computer stored in terms of their linkage to outputs, so it is possible to prepare summaries of work requirement for all 298 outputs analyzed. Since these are reasonably costly data to retrieve and present, however, and since a large number of the outputs analyzed had reasonably small frequencies of appearance, the decison was made to undertake at the present time only a limited number of such analyses. It is the opinion of the Oregon Studies staff, however, that these are the most powerful and useful cross project data reported in the Studies and that further analyses of this kind should be undertaken using the existing data base. Until such analyses are undertaken, however, or if they are not, the reader interested in the linkage of work requirement data to outputs is directed to the case profiles where such linkages are reported for each output analyzed.

Chapter 5

SITE MAPS: PROFILES OF ILLUSTRATIVE PROJECTS

The primary units of data to emerge from the Oregon Studies are the twenty case profiles contained in Volume IV of the series reporting the Studies. These "site maps" describe five educational research projects, seven educational development projects, five educational diffusion projects, and three educational evaluation projects, all of which were judged to be of a quality illustrative of desirable future activity.[1] Each individual profile contains data representative of all the classes of data described in the preceding chapter, i.e., general project descriptors, people descriptors, and conceptually linked descriptors.

The purpose of the present chapter is to introduce the reader to profile organization and content, to show how the variables described in Chapter 4 are included in profiles, and to discuss the utility of the profiles for students, trainers and practitioners. For additional detail not contained within the present chapter, the reader is referred to the sections NOTES ON THE DEVELOPMENT OF THE PROFILES and A GUIDE TO READING THE PROFILES contained in Volume IV.

Profile Organization and Content

A profile is organized around seven major components or chapters. These are:

Chapter I: Overview
Chapter II: Parameters of the Project
Chapter III: Summary of Output Data
Chapter IV: Supplementary Data
Chapter V: Project Dynamics
Chapter VI: Implications for Training
Appendix : (Recapped Interview Data)

Included in the rationale for a profile is the assumption that data collected from a site has its greatest meaning when displayed in the context from which it was derived. Thus the initial chapters move from general project descriptors, to people descriptors, and finally to conceptually linked descriptors. Closing chapters extrapolate from those data and from the impressions of interviewers to capture the essence and nature of the realities of a project. The following paragraphs provide overviews of each chapter, indicate the location of the data sets described in the chapters, and describe the way the data sets are assembled.

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[1] In the Oregon Studies the definition of "project" allows for the inclusion of ongoing activities such as public school activities in which it is possible to specify the parameters of those activities in terms of identifiable ends and support bases.

Profile Chapter I: Overview

Chapter I consists of three standard parts, which provide the bulk of the basic project descriptors, each of which deals with various aspects of the project context. The parts are:

(a) A synopsis of the project;
(b) The objectives, rationale, and significance of the project; and
(c) The context in which the project operates.

The synopsis (section a) is simply a standardized one page listing of descriptors similar to those provided on the cover sheet of a proposal. In effect it identifies the project in terms of the responsible agency and officers, the level of funding, the duration, the number of staff, etc. Section (b) further describes the project in terms of main thrusts, underlying assumptions and/or procedures which guide it, and the fit of the project in any larger scheme of things. The section, which is derived from project abstracts and interviews, makes more explicit the intended target of the effort and the consumers expected to have an interest in it. The context section (c) provides a summary of the time, place, and circumstances of the project. Typical dimensions, derived from observation as well as documents and interviews, include descriptions of the project's:

(1) relationships to other agencies and groups,
(2) substantive relationships to other, larger programs,
(3) support and technological resources,
(4) time dimensions and related constraints, and
(5) physical and environmental setting.

Central to the overall discussion of a project's context is a "contextual map" which illustrates the significant, interacting aspects of the environment.

Profile Chapter II: Parameters of the Project

The second chapter of a profile contains data on people and on conceptually linked descriptors organized into four standard parts:

(a) staff structure
(b) project roster
(c) index of outputs
(d) output map.

Those elements describing people are found in the staff structure and roster sections. The discussion of staff structure is aided by a chart which essentially illustrates the functional relationships among positions held, and/or roles carried out, by people in the project. The degree to which the illustration does, in fact, demonstrate functional relationships, rather than another level of "organizational structure," is dependent on the philosophy of the project being described and on the way personnel spoke about the structure. Project roster data includes a listing of the positions held by personnel and includes annotations which more fully describe the responsibilities to the project of the people holding each position. Both staff structure and roster data were derived from observation, documents, and interview, and were confirmed by project personnel as being accurate representations.

Chapter II introduces the first of the conceptually-linked descriptors. In this chapter a confirmed, annotated index of project outputs derived from observation, project documents, and interviews is presented. This is followed by an "output map" which illustrates the interdependencies of the outputs indexed, irrespective of time frames. While not considered an exhaustive listing of all possible outputs of a project, the outputs displayed are considered to be representative of the major concerns of the project. This means that outputs sampled cover the range of outputs which, in terms of structure, character, focus, and function, as conceptually defined in Chapter 4, led to a description of project operations which captured the essence of the project as indicated by project personnel. The indexing and mapping strategies provide a comprehensive view of the kinds of outputs a project produces, facilitate an understanding of the complexity of the operations, and contribute to the provision of equivalent data across profiles.

Profile Chapter III: Summary of Output Data

The preceding profile chapter flows into Chapter III and allows it to extend the conceptually linked descriptions of outputs. It is in Chapter III that the work requirements which relate to each of a selected sample of outputs indexed for a project are reported. Standardized sections of this chapter include:

(a) standards held for outputs
(b) tasks pertaining to output attainment
(c) enablers pertaining to output attainment.

The data presented are derived from interviews focusing on each of the outputs selected for analysis. These interviews have been recapped and coded into empirically derived category sets (see Appendices 1 to 9 in this volume) which describe these variables in manageable form. Tables of data linking these empirically derived descriptors to specific outputs are provided and serve as the focus of discussion. Narration around the tables provides a basis for interpretation of the data shown within them and highlights the data that are to be discussed in subsequent profile chapters.

The data tables discriminate the structural elements of standards and enablers, and the cluster elements of tasks, as is shown in Figure 4.1 in Chapter 4. Following these tables, and a narrative description of each, a general discussion of any significant interrelationships between them is offered.

Profile Chapter IV: Supplementary Data

Chapter IV is not as highly structured as the preceding chapters in the profile. It presents data on people and on conceptually linked descriptors and highlights those which appear to have particular relevance to an adequate description of a particular site. Standard elements include (not necessarily in the following order):

(a) frequencies of outputs (all those indexed) as ordered by structure, character, focus, and function;
(b) selected interviewee responses to questionnaire items relating to position requirements, support resources, and/or project management;
(c) interviewee responses to questionnaire items relative to the comparative emphasis given various classes of work activities.

Tables of data are presented whenever they serve to provide a necessary basis for discussion. Narrative discussion may include a comparison of these data with interviewer observations and/or with the data contained in other chapters of the profile.

Profile Chapter V: Project Dynamics

The fifth chapter of a profile focuses on those general project descriptors having to do with project dynamics. While these data were collected in a less systematic way, "cue sheets" served to sensitize the interviewers to a variety of factors which might be observed on a site. In addition, the cue sheets provided a systematic means for the profile writer to "debrief" the team and gain access to the pooled perceptions of the team.

This chapter, by design, is the least structured of the profile chapters. Its purpose is to "round out" the profile by reporting impressions about the site which the data collection team gained by virtue of having "lived" on the site for a number of days. The impressions reported are presented in whatever sequence, form, and substance the writer considered best in calling out the significant and unique features which guided the functioning of the site. This freedom to vary was considered essential to extending the meaning and credibility of the data collected. At the same time it provided a vehicle for identifying new classes of data which might be deserving of quantification.

The elements of project dynamics to be found in the collective profiles derived from, but were not limited to, the observable and "felt" influences on projects, and the people within them, as follows:

(a) staffing patterns
(b) management structure
(c) management styles
(d) commitments
(e) affective elements
(f) issues
(g) staff backgrounds
(h) agency interrelationships

This list is representative and not meant to be inclusive. Discussion of these elements is linked, when appropriate, to the data contained in previous chapters as a means of illustrating any existing characteristics of consistency or cohesiveness in the project. In keeping with the intent of the profile, however, such discussion is not meant to be interpreted as an evaluative statement by the Oregon Studies staff. Rather, its purpose is to point up features which appear to be exemplary instances of a phenomenon or a set of problem-solving or issue-resolving behaviors.

Profile Chapter VI: Implications for Training

In the final chapter of the profiles the reader will find a summary discussion of various elements of training having specific relevance to the project being described. Because the basic profile data is considered the primary source of information regarding the content of training, this summary generally comments only briefly on the basic data and elaborates on any strategies or elements which were recommended by project personnel or were implied by the nature of the data collected. Frequently the training needs mentioned by projects were a function of recalling difficulties with one or more problems encountered by the project. To a certain extent, then, it can be assumed that those items mentioned may highlight areas where competence was needed and in which preparation was weak.

Profile Appendix

The Appendix to a profile contains statements derived from tape recordings of interviews with personnel. These statements represent the "raw data" base for the conceptually-linked descriptors reported in Chapter III of the profile, i.e., the standards, tasks, and enablers which relate to the generation of specific outputs. The inclusion of the appendices in the profile serves two essential purposes, (a) to give substantive meaning to the category labels used to summarize the data reported in Chapter III, and (b) to provide the initial basis for refining and ordering data of significance to trainers in developing output oriented skills. All data analyses dealing with outputs and work requirements in the following chapters of Volume I are based upon these raw data statements.

The Utility of a Profile

The utility of a profile varies according to various elements having special relevance for different audiences. Considerations of utility must be tempered by an awareness of the strengths and weaknesses which may be inherent in the data residing in the profiles. The following paragraphs suggest possible uses of profiles.

One of the more obvious and unique contributions a profile can make is as an instrument of training through its description of "what life is like" within the context of an ongoing educational RDD&E project. From the nature of its outputs through the nature of the people producing them to the elements of interaction which take place, the user gets a sense of how things come together. The lessons learned by the participants in a project are highlighted and become, in and of themselves, useful elements of information.

Taken one at a time, the weaknesses of a profile revolve essentially around the fact that no single profile (nor any single project for that matter) illustrates the range of all possible alternatives that might have been pursued in achieving a given purpose. Even in the collective sense, by virtue of the variability sought in the projects studied, expansion of the possible alternatives relating to a single purpose is not easily accomplished. The profiles as a set, however, do afford the user with 20 instances of what life is like within projects pursuing 20 essentially different purposes. To that extent, the profiles become rich sources of descriptive information.

In short, whether the user be a student attempting to become acquainted with the field, a person just entering the field, or a project director or policy maker thinking through the kinds of preparation necessary to carry out a particular kind of project, the profiles illustrate the orchestration of various elements into an integrated unit. What is found to exist in such an integrated unit is perceived to be the essence of the focus of training. The profile attempts to put the "meat" on the bones of the "body" that is educational RDD&E rather than providing only a view of the skeleton. The how and why of a series of directed activities were the target of the profile. In finding the how and why, the attempt was made to capture the human element as it relates to the kinds of things produced. Each profile is unique in this sense, representing not only different people, but different contexts and problems. The reader is encouraged to review the profiles from the "human" side, and to seek evidence of the process of the coming together of people to solve a problem.

Chapter 6

OUTLINE MAP A: PERSONNEL WITHIN EDUCATIONAL RDD&E

It will be recalled from reading Chapter 4 that this is the first of three chapters that organize the data collected in the Oregon Studies around the focus of the projects studied, that is, around research, development, diffusion, and evaluation. It will be recalled also that the intent of these three chapters was twofold: (a) to provide a picture of the range of personnel, outputs, and work requirements found within the domain of educational RDD&E; and (b) to provide a picture of the similarities and differences within those data when they are ordered by RDD&E. Finally, it will be recalled that in these three chapters all data are reported as if they were independent data sets. Personnel are described apart from the projects in which they worked; outputs are reported as if they were independent of the context in which they rest; and work requirements are reported as if they were independent of the outputs to which they are linked. The purpose of Chapters 6, 7, and 8, therefore, is simply to provide a sense of the kind of personnel, outputs, and work requirements that exist within the domain of educational RDD&E, and how they are distributed within that domain. The interdependencies between these data sets are reported in subsequent chapters.

The aim of the present chapter is to describe the personnel working within the 20 projects studied. Data about personnel are organized to describe: (a) identifying characteristics; (b) educational experience; (c) work experience; (d) services and equipment relied upon; and (e) supplementary observations. As background information, the contractual relationship between the personnel and the projects studied, and the roles personnel performed within those projects, are also described. All data reported in the present chapter, with the exception of the supplementary observations, were collected through questionnaires administered while the data collection team was on-site.

One hundred and thirty-four persons were interviewed during the course of the Oregon Studies. Of these, 115 completed the questionnaire from which the data reported in the present chapter were derived. Since the relationship of the personnel interviewed to the projects in which they were working needs to be considered in interpreting these data, some effort must be made to understand this relationship. Two sets of data are reported toward this end: (a) a description of the contractual relationship of the interviewees to the project studied, and (b) a description of the roles they performed. The first set of data is summarized in Table 6.1. The second set is summarized in Table 6.2.

The Contractual Relationships Between Personnel and Projects

It will be seen from Table 6.1 that a variety of contractual relationships were held by personnel on the 20 projects studied. Approximately 25% of the 115 personnel queried held positions other than regular staff membership. These ranged from a subcontractor relationship to being a member of the staff of user agencies. Contractual arrangements between staff and projects were not comparable across RDD&E, however. Relatively few staff interviewed in research projects had other than regular staff appointments, while a relatively large number of irregular staff arrangements (approximately 1/3) were found within development, evaluation, and diffusion projects. It will be noted also that more staff members in development, diffusion, and evaluation projects were interviewed than in research projects. This tends to reflect differences in staff size generally observed within such projects.

TABLE 6.1

The Contractual Relationship of Interviewees
With the Projects Studied

Relationship to Project	Project Focus				Total (20)
	Research (5)	Development (7)	Diffusion (5)	Evaluation (3)	
Regular staff member	16	34	24	15	89
On-call staff member	1	--	3	--	4
Regular subcontractor staff member	--	4	1	--	5
On-call subcontractor staff member	--	1	--	--	1
Advisor/consultant	--	2	1	--	3
Manager/specialist	--	1	4	4	9
Member of participating agency	--	3	--	--	3
Member of user agency	--	--	--	1	1
Other	--	--	--	--	--
TOTALS	17	45	33	20	115

The Roles Performed by Personnel Interviewed

To obtain further clarity as to the nature of the personnel sampled, each person responding to the questionnaire was assigned a project role classification. A nine category classifiation scheme was used. Placement within this scheme was arrived at through face-to-face discussions with each respondent to the questionnaire. The distribution of the 115 respondents by job roles is summarized in Table 6.2.

TABLE 6.2

The Project Roles Performed by the Interviewees

Project Role	Project Focus				Total (20)
	Research (5)	Development (7)	Diffusion (5)	Evaluation (3)	
Principal Investigator	5	5	2	2	14
Project Director, other than Principal Investigator	2	5	4	1	12
Top level project manager, other than Project Director or Principal Investigator	2	11	6	6	25
First-line Supervisor	--	--	2	3	5
Member, professional staff	5	19	16	8	48
Member, clerical support staff	1	--	--	--	1
Member, technical support staff	2	--	2	--	4
Advisor or consultant	--	5	1	--	6
Other	--	--	--	--	--
TOTAL	17	45	33	20	115

In studying this table it is intriguing to note that approximately half of the persons interviewed identified themselves as holding positions in the top four categories which describe "management" type roles. Excluding advisors and consultants, 51 respondents classified themselves as "managers" while only 53 classified themselves as staff members. With the exception of diffusion, each of the project focus areas actually had more of the persons interviewed in management level roles than in regular staff roles. While such data can be accounted for partially by interviewee selection factors, they nevertheless raise interesting questions about who does what work on RDD&E projects.

Identifying Characteristics of Educational RDD&E Personnel

Table 6.3 presents data collected around a number of characteristics that identify RDD&E personnel. It includes data on sex, age, degree held, number of publications, salaries, and professional membership. These data should serve to give the reader some notion of the general characteristics of personnel found within the field. It should also provide the prospective RDD&E staff member with a sense of the work world into which he is moving.

As Table 6.3 shows, the majority of personnel in educational RDD&E are male. This is the case by a margin of nearly two to one. A few respondents indicated ages between 20 and 24 years, and three were over 54, but the majority fell in the age range of 25 to 44. Respondents held degrees ranging from bachelors to doctorate or higher, but all were college graduates. No one interviewed held other than academic degrees at the bachelors level or beyond. It is interesting to note that research personnel, while younger than development personnel, were more likely to possess doctorates.

While college graduation appears to be an essential characteristic for work within the context of educational RDD&E, frequent publication does not. Fifty-seven of the 95 interviewees who chose to respond to the question of publications indicated that they had published anywhere from one to more than 16 articles, but 38 indicated that they had not published at all. Of note is the large proportion of personnel in the areas of research, development, and diffusion who cited no publications.

Salaries for RDD&E personnel ranged quite dramatically from below $5,000 to above $29,000, with all ranges represented in between.

At least 12 different professional associations could claim RDD&E personnel as members. While AERA was the most frequently cited, RDD&E personnel apparently benefited from membership in such diverse associations as NEA and the Psychonomic Society.

In reviewing the data presented in Table 6.3 by project focus, a number of interesting trends can be identified. In terms of sex, for example, it appears that diffusion projects are the only ones where the male-female ratio favors females. Research, development, and evaluation projects appear to be dominated numerically by males. With respect to age, development projects appear to attract personnel over 40 while

TABLE 6.3

Identifying Characteristics of Project Personnel Interviewed

Variable Subclassifications	Project Focus				Total (20)
	Research (5)	Development (7)	Diffusion (5)	Evaluation (3)	
			Sex		
Male	13	33	15	15	76
Female	4	12	18	5	39
			Age		
No Response	2	3	5	--	10
Under 20	--	--	--	--	--
20-24	1	2	--	--	3
25-29	3	6	5	6	20
30-34	4	7	4	2	17
35-39	5	4	10	7	26
40-44	--	12	5	3	20
45-49	1	5	1	1	8
50-54	1	3	3	1	8
Over 54	--	3	--	--	3
			Degree		
No Response	--	4	--	--	4
Doctorate or Post Doctorate	8	10	5	9	32
Specialist or Professional	1	1	--	--	2
Masters	4	17	17	9	47
Bachelors	4	13	11	2	30
Associate	--	--	--	--	--
Technical License	--	--	--	--	--
None of These	--	--	--	--	--
			Number of Publications		
No Response	2	11	7	--	20
None	8	13	12	5	38
1-3	--	7	7	6	20
4-8	2	6	5	7	20
9-15	1	2	1	1	5
16+	4	6	1	1	12

TABLE 6.3 (con't.)

Identifying Characteristics of Project Personnel Interviewed

Variable Subclassifications	Project Focus				Total (20)
	Research (5)	Development (7)	Diffusion (5)	Evaluation (3)	
			Salary		
No Response	--	5	1	--	6
Under $5,000	6	3	--	1	10
$5,000-$8,999	1	3	1	--	5
$9,000-$11,999	2	8	9	2	21
$12,000-$16,999	3	13	14	6	36
$17,000-$21,999	1	8	2	8	19
$22,000-$29,000	4	3	2	3	12
Over $29,000	--	2	4	--	6
			Professional Associations		
AERA	7	9	8	15	39
NEA	--	6	7	2	15
AVA	--	1	--	--	1
APGA	--	1	--	2	3
APA	4	1	3	4	12
AECT	--	--	--	--	--
Other*	7	24	17	12	60
*ALA	--	--	2	--	--
ASA	3	--	--	--	--
ASCD	--	2	2	--	--
ASIS	--	2	3	--	--
NCME	--	--	2	2	--
NCTE	--	7	--	--	--
Psychonomic Society	2	--	--	--	--

the other three foci are staffed by a majority of personnel who are 39 or younger. It is noteworthy, however, that while development project staff appear to be older, they hold proportionately fewer doctorates than either research or evaluation staff. Only about 1 in 4 development staff had acquired doctorates, while in both research and evaluation close to half of those responding held doctorates. Diffusion focused projects had the lowest ratio of doctorates (about 1 in 6).

Salaries tended to favor evaluation personnel, with over half of their number (11 of 20) earning salaries in excess of $17,000 yearly. Both diffusion and development projects show a wide range of salaries, with the largest staff loading falling in the $12,000 to $17,000 bracket. For those working on research projects the picture appears a little bleak. While four researchers earned upwards of $22,000, six earned less than $5,000 per year. Those earning less than $5,000 were mainly graduate students, however, so the salaries for full time workers are not as low as the table might suggest.

The data on professional membership indicate that less than 50% of those interviewed belonged to any organization, and of those who did claim memberships many belonged to more than one association. It appears that AERA was the most popular association for staff in all project foci, with a substantial number of diffusion and development personnel holding membership in NEA.

Taken as a whole these data do not present a picture of educational RDD&E that quite fits a "traditional" view of the field. There were proportionately fewer staff that held doctorates than expected, especially considering the high proportion of "manager" level roles filled by personnel studied. There were also fewer publications, fewer memberships in AERA, and higher salaries than expected. Contributing factors here may include the project settings. Four of the five research projects studied, for example, were located in college/university settings. While the youth of the research personnel sampled may help to explain the small number of publications produced, generalization of such a hypothesis to the development, diffusion and evaluation parts of the sample does not seem to follow with the same logical ease. Could such factors as the differentiation of responsibilities within projects, their size and setting have contributed? Logically, and from impressions obtained by the interview staff, any number of these factors could have played a significant role.

The Educational Experience of RDD&E Personnel

One of the important characteristics of RDD&E staff is the educational experience they have had. While degrees held are one measure of academic preparation, it was felt that data on areas of specialization would also be helpful in arriving at a picture of personnel working within the field. Accordingly, the major and minor academic fields of study pursued by the interviewees while in college are displayed in Table 6.4.

Major areas of study cited by RDD&E personnel ranged from the predictable Education/Teaching category to such diverse fields as Engineering, Business Administration and a sizable number of "others." The diversity of minors is equally extreme and, although there is a heavy emphasis on education-related fields, the number citing other areas is impressive. (A discrepancy will be noted in the totals at the bottom of Table 6.4. This is accounted for by the fact that some respondents cited two majors, and some cited two or more minors.)

Within each of the focal areas a number of interesting findings appear. Personnel working on projects with an educational research focus cited no majors in Education, and only two majors in Educational Research. The heavy emphasis for research personnel appears in the area of Psychology. Minors for this group indicate the same trend. Only one of the project focus areas, development, shows a substantial grouping of majors in the area of Education/Teaching. Even here, however, that is not the largest cluster, for while 11 of the staff of development projects cited Education/Teaching as a major, 14 cited areas other than those listed. Even as a minor, Education/Teaching did not dominate the educational experience of those in the field.

TABLE 6.4

The Educational Experience of RDD&E Personnel

Educational Experience	Major(s)				Minor(s)				Totals	
	R	D	D	E	R	D	D	E	Maj.	Min.
No Response	1	4	--	--	7	16	9	2	5	34
Education/Teaching	--	11	5	5	1	9	5	4	21	19
Education Administration	1	6	5	2	--	1	1	--	14	2
Educational Research	2	1	3	2	2	3	2	4	8	11
Guidance/Counseling	3	2	1	2	--	--	2	1	8	3
Vocational Training	--	--	--	--	--	--	--	--	--	--
Statistics/Measurement	--	--	1	2	1	3	3	6	3	13
Psychology	7	1	4	5	4	4	5	4	17	17
Engineering	--	1	--	--	--	1	--	--	1	1
Computer Sciences	--	--	--	--	--	--	--	--	--	--
English/Writing	--	7	4	--	--	8	4	1	11	13
Business Administration	--	2	2	--	--	1	1	1	4	3
Other	4	14	12	5	2	5	10	7	35	24
TOTALS	18	49	37	23	17	51	42	30		

Surprisingly, majors and minors in Psychology and English/Writing were reasonably common in the sample of personnel as a whole. Psychology appeared consistently across foci both as a major and a minor. Majors and minors in English/Writing seem to concentrate in development and diffusion projects. Apparently college experience in a wide range of fields outside education has relevance to the work of educational RDD&E.

The Work Experience of RDD&E Personnel

In an attempt to describe the work background of RDD&E personnel, data were collected in relation to work settings and work experiences. Work setting data are reported in terms of 9 categories, including such background as public school experience and research in colleges or universities. These data provide information about the contexts in which educational RDD&E personnel work. Work experience data are reported in terms of six descriptors such as Experience in Educational RDD&E and Times as Principal Investigator. Additional data are reported that describe the experience demanded or required of RDD&E personnel to perform the work for which they are currently responsible.

The data displayed in Table 6.5 indicate the type of settings in which the RDD&E personnel interviewed have worked, and the number of years spent in those settings. Those responding (many staff either indicated no previous work experience or did not respond to these questions) cited all nine work setting categories, and indicated having worked in the settings anywhere from 0 to 16 years or more. (A number of respondents indicated having worked in two or more settings for varying lengths of time.) The two settings cited most frequently by RDD&E personnel generally were public school and present organization. Experience in both settings ranged from 1 to 16 or more years. Of interest in this regard was the small number of personnel in research who indicated they had had work experience in public schools. Only four research personnel cited experience in public schools and of those, five years was the maximum time spent there.

Other work settings in which research personnel had worked included college research/teaching and work in R & D centers. A relatively high proportion of personnel in both diffusion and development projects indicated work experience in the public schools. In many cases that experience extended beyond six years duration. Evaluation personnel indicated a frequent history of experience in college settings and public schools. This was somewhat unexpected in that data reported previously have tended to show evaluation and research personnel to be similar, but a breed apart from personnel in development and diffusion projects.

In conclusion it can be said that personnel in development projects tend to display a history of work experience in a wider range of settings than personnel in research, evaluation, or diffusion projects. Personnel in diffusion projects follow closely in this regard, and are followed in turn by personnel in evaluation and research projects respectively.

The data displayed in Table 6.6 indicates the on-the-job work experience of educational RDD&E personnel. Six categories of work experience were the focus of data collection. These categories ranged from general RDD&E experience to project management experience. The data are displayed to show the responses of personnel to categories of work experience by

TABLE 6.5

Years of Experience in Selected Work Settings for RDD&E Personnel'

Work Setting	Years of Experience																															
	Research (5)								Development (7)								Diffusion (5)								Evaluation (3)							
	1	2	3	4	5	6-10	11-15	16+	1	2	3	4	5	6-10	11-15	16+	1	2	3	4	5	6-10	11-15	16+	1	2	3	4	5	6-10	11-15	16+
Teaching in a College or University	2			1		5	2		2	2	3	5		2	4	1	4	2	1			1			7	2	2	2				1
Conducting Research in a College or University	2	2			1	4	2		3	1	2	1	3	3	1	1	2	2		1					2	1	1			2		
Working in Public Schools	1		1	1	1				2	5	3	4	1	7	1	6	3	2	2	2		12	3	2	2	1	1	2	1	2	1	2
Working for State or National Educational Agencies		1								1	2	1	2	3			1	1	1						2					1		
Working in Educational R&D Centers	2	1	1	2	2		1		2	5	2	1	2	1			3	2	1			1			3	1						
Working in Present Organization (may overlap with above)	5	2	1	1	1	3			2	6	4	2	1	5	1	1	8	8	3	2	1	1	1		2	1	5	1		2		
Other Educational or Research Employment	3								1		2	1	2	5		1	1		2	1		3	1		1	3	1		1	2	1	
TOTALS	15	6	3	5	5	12	5	0	12	20	18	15	11	26	7	10	22	17	10	6	1	18	5	2	19	9	10	5	2	9	2	3

TABLE 6.6

On-the-Job Work Experience of Personnel in Educational RDD&E

Work Experience	PROJECT FOCUS																																			
	Research (5)									Development (7)									Diffusion (5)									Evaluation (3)								
	0	1	2	3	4	5	6-10	11-15	16+	0	1	2	3	4	5	6-10	11-15	16+	0	1	2	3	4	5	6-10	11-15	16+	0	1	2	3	4	5	6-10	11-15	16+
Years Experience in Ed. RDD&E	1	1	5	1	1	2	1	1	1	5	6	6	5	3	5	7	4	2	4	5	9	2		3	1		2	3		3	3	3	2	5		1
Projects Worked On	2	3	1	2			3			6	3	5	2	2	3	2	2	2	3	5	6	2	1	2	2	1	1	3	1	2	1		1	1	1	5
Funded Projects Now Working On		8	2	2							16	9	4	2						15	5	2		1	1			1	7	1	3			1	1	4
Proposals Worked On	3	2				1	1		1	6	3	4			4	5	3	2	6	7	1	2	3	1	1	2	2	5	1	2	2	2		4	1	2
Times as Principal Investigator	5	1	1				1			16	3	3	2	3	1	3	1		12	5	1	1		1	1			7	2	2				3		1
Years Managerial Experience on RDD&E Projects	5	2	1			3	2		1	17		1	2	1	8	6	2		8	3	6	2		1	3		1	6		3	4	2	1	3		1
TOTALS	16	17	10	5	1	6	8	1	3	50	31	28	15	11	21	23	12	6	33	40	28	11	4	9	9	3	6	25	11	13	13	7	4	17	6	14

project focus. The total number of respondents shown by category differ because some interviewees did not respond to some of the questions used to elicit data in each category.

As evident from the table, some personnel in each project area had experience in each category of work experience. The range of experience is impressive. In all foci personnel indicated experience in RDD&E ranging from 1 to over 16 years. Some personnel had worked on more than 16 projects and some had no experience on projects at all. Most personnel were presently working on one, or at most two or three projects, but a few were working on upwards of 16.[1]

A few respondents in each project area indicated experience in proposal writing, experience as project investigator, and experience in project management. The range of experience reflected by these items again covered the spectrum of response opportunities.

In terms of experience by project focus, research again appears most unique. This consistent difference may be peculair to the projects studied, the personnel on those projects, or the small number of respondents, but there are differences that stand out. While research personnel appear to have the same broad range of work experience within RDD&E generally, they appear to be less experienced in terms of the number of projects worked on, the number of proposals worked on, and especially the number of times as principal investigator. The number on these projects who are graduate assistants partially account for this uniqueness. Evaluation personnel stand out in the category Funded Projects Now Working On. While personnel in research, development, and diffusion tend to work on no more than three or four projects at a time, a sizable number of evaluation personnel claim to be working on 16 or more projects at one time. These data are influenced by the experience of staff members in a research and evaluation unit within a large school system, and as such may not be representative of the experience of evaluation staff generally.[2]

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[1] A consequence of working in the Research and Evaluation Division of a large city school system.

[2] In the evaluation focused projects, four individuals responded that they were working on 16 or more funded projects. Because of this "peculiar" result the questionnaires from which this data were abstracted were reviewed. It was found that all four of the individuals who indicated working on so many projects were from evaluation projects currently functioning within a large metropolitan school district. In reviewing this finding with the team of individuals who visited the site it was discovered that the projects varied in terms of their size. A number of them were quite small, short-term evaluation projects. Many of them, however, were fairly large district-wide undertakings. In these cases the individuals' time commitment to any given project tended to be quite small.

In order to provide an added perspective to the data on work experience a set of questions was asked respondents that focused on the type of experience their own work required. Table 6.7 displays these data by project focus.

It will be seen from these data that the range of responses to the questions asked was surprisingly broad. While a substantial number of personnel suggested that no prior experience was necessary for the performance of their present job, some personnel suggested that five or more years of experience were required. Personnel in research (who have had least experience) appeared to value experience less than did other personnel, while evaluation personnel seemed generally to value experience most highly. Experience also seemed to be valued more highly by diffusion personnel than by development personnel, especially in relation to the performance of administrative and managerial jobs. Only one person from the entire sample, however, felt that more than 10 years experience was required to perform work in any area.

It is interesting to note that very few individuals felt that any experience was required to function in administrative or management roles. This is an interesting result in light of data reported subsequently in the volume. Of the 962 outputs of work effort identified in the 20 projects studied, 514 were classified as being "management related." Any number of hypotheses could account for this apparent discrepancy but in light of the increasing awareness of the criticalness of the management function in large scale RDD&E efforts it is a discrepancy that should be investigated.

Along with responding to work requirement questions, interviewees were also asked to indicate the type or level of academic degree they considered necessary for the work they were engaged in. Table 6.8 presents the data that resulted from responses to this question. The data presented in the table are about as expected, given the data previously presented on degrees held by RDD&E personnel (see Table 6.3, page 85). Evaluation personnel emphasize the doctorate proportionately more often than personnel in other project areas, though research is not far behind. Diffusion personnel seem to feel the need of the level of academic training that accompanies the doctorate least.

It is also worthy of note that, with the exception of evaluation, at least one person in each project area felt that none of the degrees listed was necessary for the work they performed. In general it can be concluded from Tables 6.8 and 6.3 that RDD&E work, almost without exception, requires academic degrees of at least the bachelors level.

Support Services and Equipment

To further describe the conditions of work for RDD&E personnel, data were gathered with respect to support services and support equipment used.

TABLE 6.7

Experience Perceived as Necessary by RDD&E Personnel to Perform Various Job Roles

Area in which Experience is Required	PROJECT FOCUS																															
	Research (5)								Development (7)								Diffusion (5)								Evaluation (3)							
	0	1	2	3	4	5	6-10	10+	0	1	2	3	4	5	6-10	10+	0	1	2	3	4	5	6-10	10+	0	1	2	3	4	5	6-10	10+
Educational RDD&E Generally	6	2	2	3		1			11	4	6	11	1	8		1	6	4	6	7	1	4	2		1	3	5	2	1	4	2	
Administration	7	2	1	3		1			16	6	6	9		3	1		7	8	5	4	1	3	2		5	6	4	2			1	
Management	5	1	1	1		1			15	5	2	4	2	3	1		9	2	5	1		3	1		6	4	5	1			1	
TOTALS	18	5	4	7		3			42	15	14	24	3	14	2	1	22	14	16	12	2	10	5		12	13	14	5	1	4	4	

TABLE 6.8

Level of Academic Training Cited by Interviewees As Required by the Position Held

Required Experience Level of Academic Training	Project Focus				Total (20)
	Research (5)	Development (7)	Diffusion (5)	Evaluation (3)	
No Response	1	1	--	--	2
Doctorate	6	8	4	9	27
Specialist or Professional	2	5	2	3	12
Masters	1	15	12	7	35
Bachelors	6	11	12	1	30
Associate	--	--	--	--	--
Technical License	--	--	--	--	--
None of these	1	5	3	--	9
TOTALS	17	45	33	20	115

Table 6.9 displays the variety of support services used by RDD&E personnel, by project focus, and Table 6.10 provides the same type of display for support equipment.

The data presented in Table 6.9 make readily apparent the wide range of usage of an extensive variety of support services. Each of the 24 services listed is used in some measure by personnel in each of the project areas. Virtually the same statement can be made with respect to the 12 types of support equipment listed in Table 6.10.

Far outweighing all other categories of support service is that of typing. The relatively high frequency of printing, additional secretarial service, and computer analysis services cited irrespective of project focus, is also noteworthy. Little wonder the oft heard claims that "An organization runs because of its secretaries.", and "We're drowning in paper."

The support services used by at least 50% of project staff, without respect to project focus, are: Printing; Secretarial Services other than

TABLE 6.9

Frequency of Support Service Use

Support Services Provided by other Persons or Agencies	Project Focus				Total 115
	Res.	Dev.	Diff.	Eval.	
Total No. of Respondents	17	45	33	20	
1. Typing	14*	41*	29*	17*	101*
2. Printing	10*	32*	21*	16*	79*
3. Secretarial service, other than typing	12*	30*	21*	10*	73*
4. Computer analysis services	13*	21*	23*	15*	72*
5. Purchase of supplies & equip	11*	19	23*	12*	65*
6. Library holdings	9*	24*	19*	13*	65*
7. Budgetary & other fiscal accounting	11*	19	19*	10*	59*
8. Other reproduction services	10*	24*	13	11*	58*
9. Statistical consultation	10*	13	18*	16*	57
10. Computer program writing	13*	12	15	15*	55
11. Subjects for experimentation or try-out of procedures	7	24*	15	9	55
12. Audio-visual aids and devices	5	24*	19	6	54
13. Subscriptions to techn. & prof. journals/periodicals	9*	10	21*	12*	52
14. Travel arrangements	11*	14	19*	6	50
15. Scoring of test items	6	17	19*	7	49
16. Editing	6	17	18*	7	48
17. Art work and illustrations	6	15	17*	9	47
18. Requests for documents or publications not locally avail.	7	10	18*	9	44
19. Photography	3	10	14*	3	30
20. Technical writing	4	6	13	5	28
21. Television facilities & equip.	3	7	8	5	23
22. Other services	3	7	5	4	19
23. Drafting	3	5	6	3	17
24. Equipment construction	3	2	8	2	15

* Represents use by at least half of respondents.

typing; Typing; and Library holdings. Support services utilized by at least 50% of project staff within three project foci would increase the list to include: Other reproduction services; Purchase of supplies and equipment; Subscriptions to technical and professional journals/periodicals; Computer analysis services; Statistical consultation; and Budgetary and other fiscal accounting.

The data presented in Table 6.10 are equally impressive in demonstrating the heavy reliance of RDD&E personnel on equipment. With one exception, all items listed were in use in all project foci. The two most frequently used pieces of equipment were desk calculators and dictating equipment. While desk calculator usage appears to be fairly well distributed across research, development, diffusion, and evaluation projects, dictating equipment appears to be used most often in development projects. In general it would appear as though research and evaluation personnel utilize equipment which is oriented toward the reduction of data, either by hand or computer, more often than development and diffusion personnel. On the other hand, development and diffusion personnel apparently make use of photographic and video tape equipment more often than staff on research and evaluation projects. The equipment and support needed on a project is, of course, determined to a great extent by the nature of that project. This fact must be considered in interpreting the data presented in Table 6.9 and 6.10.

Supplementary Observations

A number of additional observations about RDD&E personnel are noteworthy. First, it was not unusual for the staff of a project to vary markedly in its composition over time. In one of the projects studied it was noted, for example, that a complete staffing change was made after the first year of operation. This resulted from the project having been initiated by senior staff members of the sponsoring organization, and that as soon as the planning, designing, and start up phase of the project had ended a production oriented staff took their place.

A second observation, and one that squares with data reported in the chapter, was that a sizable number of staff members associated with projects held multiple project assignments. In most of these instances the percentage of time dedicated to one project was minimal, and the role they tended to play was one of "reviewer and critiquer" of daily work production and/or "planner and director" of long range work activities. Such persons also tended to spend considerable time and energy in contact with other individuals and agencies engaged in similar work. It was not at all unusual for persons of this kind to be unable to respond to detailed questions about project operations.

Another phenomenon observed frequently in the projects visited was the subcontracting of major portions of work activity to other individuals and

TABLE 6.10

Frequency of Support Equipment Use

Support Equipment Immediately Available and Used by Project Respondents	Project Focus				Total
	Res.	Dev.	Diff.	Eval.	115
Total No. of Respondents	17	45	33	20	
1. Desk calculators	11*	18	11	16*	56
2. Dictating equipment	7	25*	12	9	53
3. Key-punch machine	14*	9	12	11*	46
4. Other equipment	9*	19	13	3	44
5. Data card sorter	12*	8	5	10*	35
6. Video tape	3	15	9	6	33
7. On-site computer	9*	7	3	12*	31
8. Readers for microfiche or microfilm	4	5	13	7	29
9. Photographic equip.	2	11	10	5	28
10. Remote computer terminal	9*	7	3	2	21
11. Television camera	2	4	7	4	17
12. Desk-top computer	1	0	5	9	15

* Represents use by at least half of respondents.

agencies. These subcontracts generally took the form of formal agreements, but they also included a range of advisory and consultant arrangements. The variation in the background experiences of the advisors and consultants encountered in this connection was remarkable.

The staffing patterns encountered in projects also showed a great deal of variability. Within the 20 projects studied staffing patterns varied from two men "sharing" project responsibilities to a complex, and highly structured "corporate" staffing arrangement. It also varied with the size and setting of a project, the role played by subcontractors and consultants, and the particular outputs for which the project was responsible. As a consequence, the overwhelming impression gained in regard to staff structure was one of variability. In almost every project, however, care was taken to point out that the organizational structure adopted was "functional" rather than "formal" in nature. While that distinction was never made perfectly clear, a functional organization apparently calls for an alignment of staff by work activities rather than job titles or organizational boxes. On the basis of that which has been observed, however, it is doubtful that constructs such as pyramidal and corporate structures can accommodate the variability that exists in staff arrangements in the domain of educational RDD&E.

Chapter 7

OUTLINE MAP B: OUTPUTS OF EDUCATIONAL RDD&E

This is the second of the three chapters that organize the data collected in the Oregon Studies around the focus of the projects studied. It is the first to report the data that are central to the studies, and as such, serves as an anchor for the data reported in subsequent chapters. The aim of the chapter is to describe the outputs of work effort identified within the 20 projects studied.

As used in the Oregon Studies, an output is defined as "an identifiable outcome of targeted work activity that contributes to the realization of project goals." So conceived outputs vary considerably. They can take the form of a contracted-for outcome of a project, for example a final report of research done, a mediated instructional system, a set of trained diffusion agents, or they can take the form of any of the hundreds of "outputs" required to produce a contractual outcome, for example data collection instruments, a computer program, a literature review, the various instructional elements that make up a mediated instructional system. They can also take the form of field trial results of an instructional system or the PERT diagrams used by persons responsible for producing such a system to insure that all elements within it are completed on a given time line. Outputs can assume the form of "hard products," such as those just described, or they can assume the form of events or conditions. Events, such as conferences, staff meetings, and the selection of personnel, represent the outputs of work effort just as surely as hard products. So also do conditions such as competently trained diffusion agents, parents cooperating in curriculum planning, and good staff morale.

Outputs, then, may be big or little, hard or soft, and essentially infinite in their substantive focus. The defining feature of outputs is that of being an identifiable outcome of targeted work activity that can be shown to contribute to the realization of the goals of a particular project. The decision rules governing the identification of outputs are described in detail in Volume V of the series of volumes reporting the Oregon Studies.

It will be recalled from Chapter 4 that a 2-step process was involved in identifying the outputs of a project: (a) establish a list of all outputs associated with the project (an output index); and (b) order those outputs according to their interdependencies (an output map). A wide variety of sources were used in developing the output index. Any and all documents describing the work of a project were consulted, including the project proposal and work management charts. Project directors and other persons in management positions were approached specifically for a listing of project outputs. Finally, all project staff were asked to review, revise and add to tentative listings of project outputs.

Once identified, outputs were "mapped" in terms of their interdependencies. Much the same process was followed here as in output identification.

Documents were referred to; project directors/managers were interviewed; and staff were asked to review and revise approximations to the map.

The process of establishing an output index and map for a particular project was begun at the time the director of a project was first contacted about participation in the Oregon Studies. It continued throughout the preliminary project review process and resulted in a data collection team arriving at a given site with a firm approximation to an output index and map for that site. The first day on the site was spent refining and confirming the two documents. Subsequent modifications were free to occur as additional information was gained about a project, but these tended to be few. Only outputs identified by project staff as significant to the operation and well being of a project were included in an output index and map. Each case profile is to a large extent designed around these two documents.

Nine hundred sixty-two outputs were identified in the 20 projects studied. The outputs identified for any single project varied from 14 to 205. The number of outputs identified in each project studied are listed in Table 1.

TABLE 7.1

The Number of Outputs Identified in the Projects Studied

Project Number[a]	Outputs Identified	Project Number	Outputs Identified
1	40	11	22
2	20	12	18
3	14	13	67
4	28	14	44
5	17	15	70
6	67	16	57
7	48	17	57
8	15	18	47
9	30	19	205
10	65	20	32

[a] As listed sequentially in Volume IV of the series of volumes reporting the Oregon Studies.

The Classification of Outputs

The task of giving order to the outputs identified was a major one. The decision was made early in the Oregon Studies not to impose preconceived category sets upon the data collection process, but rather to let category sets emerge from the data collected in the field. Procedurally this required that outputs be listed sequentially as they were identified.

within and across projects, and that commonalities be found between them. Three classification systems were developed for purposes of identifying commonalities between outputs. These were labeled, respectively, as the *primary* system, the *cluster* system, and the *dimensional* system.

Primary Categories of Outputs

In keeping with the commitment to have the category sets that describe outputs emerge from the language of persons in the field, the initial classification given outputs involved labels that had "intrinsic" meaning, and that were "close to the source." Operationally, this meant that category labels describing output commonalities involved a low level of abstraction and corresponded closely to the descriptions of outputs provided by persons in the field. Categories descriptive of output commonalities at this first level of abstraction were labeled *primary* output categories. Three hundred twenty-six primary categories were established to code the 962 outputs identified. The full listing of primary categories, and the number of outputs classified within them, are provided in Appendix 1.

Cluster Categories of Outputs

As the number of primary output categories grew it became increasingly difficult to apply them with efficiency and reliability to the classification of outputs. As a consequence, in order to group the primary categories into manageable "clusters" for purposes of output classification, and in order to better comprehend the nature of the variability within the primary categories, a second order or *cluster* set of categories was developed for the primary categories. The guiding principle in developing the cluster categories for outputs was also one of maintaining the intrinsic meaning of output labels. Beyond that, however, and the traditional requirement of discreteness, clarity, and operational definition, the cluster categories were free to emerge as dictated by the content of the primary category set.

Fifty-one cluster categories were established to code the 326 primary categories. Appendix 2 contains a complete description of output cluster categories and the frequencies with which they were used to classify outputs appearing in the primary category sets they incorporate. The primary categories incorporated within each cluster category are listed in Appendix 3.

In distinguishing between primary and cluster output categories, and understanding the relationships between them, it is important to realize that primary categories are free to occur within any cluster category. Table 7.2 illustrates this relationship between the two category sets by showing two different cluster categories that share a common primary output category. While such overlapping is free to occur, in practice it is a relatively infrequent phenomenon.

Two additional items need to be taken into account in understanding the relationship between primary and cluster output categories. First, both are treated as open sets. As additional outputs are identified in subsequent

TABLE 7.2

An Illustration of the Relationship Between Primary and Cluster Output Categories

Set DE Coding	Cluster Output	Set FGHI Coding	Primary Category of Outputs	Freq	Freq	Primary Category of Outputs	Set FGHI Coding	Cluster Output	Set DE Coding
01	Reports/Contracts	0158	Evaluation Report	24	19	Project Time Line/Schedule	0013	Work Management Systems	05
		0006	Terminal Report	16	7	Budget Allocations	0324		
		0089	Status Condition Report	14	4	Intraagency Opns Control Form	0145		
		0099	Progress Report	13	3	PERT Chart	0083		
		0007	Proposal	10	3	Handling Sys: Project Outputs	0211		
		0040	Description of Program/Project	9	2	Learner Data File	0033		
		0144	Financial Report	7	2	Quality Control Schema	0218		
		0230	Technical Report	6	2	Correspondence	0269		
		0053	Abstract Program Descriptions	4	2	Memos/Directives/Bulletins	0282		
		0146	Contracts for Service	3	2	Work Assignment Record	0329		
		0261	Formative/Field Test Eval Data	3	1	Advisory Committee	0016		
		0286	Survey Reports	3	1	Description of Program/Project	0040		
		0216	Dissertations	2	1	Site Visitation Schedule	0045		
		0274	Usage Report	2	1	Implementing Plan, I-M Handling	0067		
		0047	A/V Descriptions of Programs	1	1	Automated I-M Handling System	0094		
		0068	Review Procedures, I-M Handling	1	1	Project Products Distrb System	0115		
		0071	Review of Design Report	1	1	Mailing Lists	0184		
		0090	Report of Operations Analysis	1	1	Evaluation Plan/Design	0281		
		0255	Interview Reports	1	1	Organizational Chart	0285		
		0278	Prospectus/Letters of Intent	1	1	Task/Time Allotments	0288		
					1	Management Information Center	0291		
					1	Mediated Data Display	0292		
					1	Operations Progress Chart	0294		
					1	Feedback System Classroom Mgmt	0297		
					1	Reporting Procedures	0326		
					1	Coordination/Liaison Procedure	0327		

studies, additional primary categories, if needed, may be developed to accommodate them. The same holds with respect to cluster categories. If additional classes of primary categories emerge that cannot be handled in the existing cluster set, new cluster categories may be developed.[1] Second, the total number of outputs classified as falling within a cluster category is not necessarily a reflection of the number of primary categories that make up a cluster category. The data contained in Table 7.2 demonstrate this point. In the table, 122 outputs and 20 primary categories of outputs are shown as falling within cluster category 01. In cluster category 05, however, which contains a larger number of primary output categories (26) only 62 outputs are identified as falling within the cluster category. While such an arrangement is not uncommon in hierarchically ordered category sets, the reader needs to be attuned to the fact that the frequency with which a cluster category is used (the number of outputs coded within it) is not directly related to the number of primary categories it subsumes. Again, the reader is directed to Appendix 3 for a complete listing of the primary output categories that make up the cluster categories, and the frequency distribution of both by project focus.

Categories Describing the Dimensions of Outputs

At the same time that primary and cluster category sets were being developed for the coding of outputs, an effort was made to identify the various dimensions on which outputs varied. The first dimension to emerge with any degree of clarity was that which has been labeled the structure of outputs. Early in the Oregon Studies the conception held of outputs was product oriented, that is, outputs were thought of only as being tangible or "hard" outcomes of work effort that were concrete in form and transportable at some point in time. As the studies progressed, however, and the data on outputs of projects accumulated, it became clear that RDD&E projects often sought outputs of work effort that were not tangible or transportable. Ultimately it was recognized that events and conditions were also outputs of work effort. This recognition led to the present structural classification of outputs as being either products, events, or conditions.

Operationally, all outputs were identified as falling into one of these three categories. As such, the structure of outputs served as the primary organizer of outputs within the primary and cluster sets, that is, each output identified received a structural classification as well as a primary and cluster classification. The categories used in classifying output structure were defined as follows:

Product - An outcome of work effort that is tangible or concrete in form, and transportable at a given point in time, e.g., a single concept film, a budget, a book.

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[1] As they presently stand the cluster categories have received no intensive, "after the fact" analysis as to discreteness, overlap, equivalence in level of generality, etc. An extremely useful follow-on activity to the Oregon Studies would be such an analysis.

Event - An outcome of work effort that results in the occurrence of an observable transaction or set of behaviors, e.g., a seminar, a staff meeting, a field test.

Condition - An outcome of work effort that creates a desired circumstance expected to endure over the life of a project, or as a result of it, e.g., parental involvement in planning school curricula, good staff morale.

Three additional dimensions of project outputs were identified during the course of the Oregon Studies. These were the dimensions of function, character, and level. The functional dimension of outputs refers to the use made of an output within the context of a particular project; and the level dimension refers to the hierarchical standing of an output within the context of a particular project. As used in the Oregon Studies, these output dimensions were defined as follows:

Output Function - The attributes of an output that mark it as serving a policy, management, or production function.

Output Character - The attributes of an output that mark it as an instance of knowledge, technology, implementation, or information.

Output Level - The attributes of an output that identifies its relationship to project goals as focal, component, or facilitating.

The data presented in the present chapter deal only with the structural attributes of outputs. Data describing the function, character, and level of outputs are presented in Chapter 9.

Primary Categories of Outputs

Table 7.3 displays the number of primary output categories used to describe the products, events, and conditions identified within the 20 projects studied. The table needs to be read as follows: a total of 326 categories were developed to classify the 962 outputs identified. Two hundred forty-five of the 326 were used to classify products, 43 to classify events, and 38 to classify conditions. Of the 245 product categories 40 were used to classify products identified in the five research projects studied, 125 were used to classify products identified in the seven development projects studied, etc. Clearly, the most noticeable feature of the table is the predominance of product categories over event and condition categories. The large number of product categories is a reflection of two factors: (a) the remarkable number of "hard outputs" that emerge from projects; and (b) the fact that the event and condition codes were not used until midway through the Studies. Once these category sets emerged, all

TABLE 7.3

The Number of Primary Output Categories Used to Describe Products, Events, and Conditions

Output Structure	No. of Categories Derived	Project Focus			
		Res. (5)	Dev. (7)	Diff. (5)	Eval. (3)
Products	245	40	125	139	52
Events	43	18	15	27	12
Conditions	38	11	14	24	10
TOTALS	326	69	154	190	74

previously coded outputs were recoded to determine if outputs that had previously been forced to fit the classification of product were better coded with the new categories. As expected, some did, but undoubtedly many outputs that would have fit the definition of events and conditions were missed in the earlier data collection procedures. So, even with recoding the originally collected data, and applying the codes from midway in the studies on, the total pool of events and conditions around which to build primary category sets remained relatively small. This is reflected in the relatively small number of categories in Table 7.3 for use in coding events and conditions. This imbalance, and the reasons for it, needs to be kept in mind when considering the data presentations and discussions that appear in the paragraphs that follow.

Products

The 245 primary categories used to describe products are displayed in Appendix 1. The total number of products coded within the 245 categories sums to 759. The number of products coded within any single category ranges from one to 24, with 113 of the 245 categories containing only one output entry. Table 7.4 displays, by project focus, the five categories used most frequently to classify products.

Three aspects of the data presented in the table are noteworthy: (a) the small number of products coded within any one category; (b) the fact that all five categories were used across all four project foci; and (c) the uneven use patterns of some categories across RDD&E, for example, Evaluation Report and Descriptive Data Tests, and the relatively even use of others, for example, Project Time Line/Schedule and Terminal

TABLE 7.4

The Five Categories Used Most Frequently to Classify Products

Code NO	Primary Categories of Outputs	Project Focus Res. (5)	 Dev. (7)	 Diff. (5)	 Eval. (3)	Totals (20)
0158	Evaluation Report	1	1	12	10	24
0013	Project Time Line/Schedule	4	6	7	3	20
0187	Descriptive Data Tests, Subject	14	1	3	1	19
0006	Terminal Report	6	3	4	3	16
0082	Questionnaire	2	5	6	2	15
Total number of products coded within the five categories		27	16	32	19	94
Total number of products identified		83	282	295	99	759
Percentage of products coded with the five categories		33%	06%	11%	19%	12%

Report. The significance of Table 7.4, however, lies not so much in the data it presents as in the data it does not present. The relatively few products coded within the five categories listed, and the necessarily infrequent use of the 238 categories of products not appearing in Table 7.4, gives evidence of the wide and varied range of products produced within the various project foci. Because of variability found within the product data, and the low frequencies involved, the reader is encouraged to inspect Appendix 1 closely.

Events and Conditions

The reader will see from an inspection of the events and conditions categories listed in Appendix 1 that essentially the same pattern exists there that exists for products. Like products, they have extremely small frequencies and vary widely across project foci. Of the 43 primary categories used to describe events, only three contain outputs that crosscut all project foci. Primary event category 0241 Selecting Personnel occurred more frequently than any other (16 times) and was cited in all focus areas. Diffusion projects accounted for nine of those citations, however. Primary event category 0176 Training Workshop Conference also occurred in all project foci. It was cited a total of nine times. Output 0012 Assigning Work was the lone remaining category of event to be cited across all project foci, and it was cited only five times. Twenty of the 43 primary categories of events were used to classify a single event. Of all events identified 23 were found within research projects, 19 within development projects, 67 in diffusion projects and 21 in evaluation projects.

The most frequently cited category of conditions occurs only seven times. The category Adequate Staff is one of only two conditions to be represented in all four project foci. The other, Staff Welfare, is cited only five times. Of the remaining 36 categories within the set, none were used more than four times to classify outputs and over half were used only once.

As in the case of the primary categories descriptive of products the reader is encouraged to inspect Appendix 1 from the point of view of the nature and range of the events and conditions categories cited there, as well as their distribution by project focus. In light of the project sample, however, and the late appearance of the event and condition codes, care must be taken in interpreting these data.

Cluster Categories of Outputs

Table 7.5 summarizes the number of cluster categories used to describe the products, events, and conditions identified within the 20 projects studied. The table is to be read in the same way as Table 7.3.

TABLE 7.5

The Number of Output Cluster Categories Used to Describe Products, Events, and Conditions

Output Structure	No. of Cluster Categories Derived	Project Focus			
		Res. (5)	Dev. (7)	Diff. (5)	Eval. (3)
Products	20	11	16	16	10
Events	19	12	9	17	9
Conditions	12	9	6	9	8
TOTALS	51	32	31	42	27

As will be seen from the table, the wide disparity in number of primary categories used to code products, events, and conditions is not maintained in the cluster categories. Twenty cluster categories were needed to code the 245 primary categories of products; 19 cluster categories were needed to code the 43 primary categories of events; and 12 cluster categories were needed to code the 38 primary categories of conditions. Obviously, the number of primary categories subsumed under the product clusters exceeds the number under the event and condition clusters, but in absolute terms they are reasonably comparable in number. Illustrations of the cluster categories used in describing products, events, and conditions are provided in Table 7.6.

TABLE 7.6

Examples of Output Cluster Categories that Describe Products, Events, and Conditions

Output Structure	Examples of Cluster Categories
Product	Guides/Manuals; Critiques; Publications
Event	Training; Staff Meetings; Field Trials/ Experiments
Condition	Accountability; Informed Public; Trained Staff

Products

The twenty cluster categories used to describe products, and the frequency with which they were used across project foci, are presented in Table 7.7. Three features dominate the data presented in the table: (a) the fact that approximately half of the cluster categories were used frequently and half were used infrequently; (b) the fact that of the frequently used categories only four (products 01, 27, 02, and 03) were used consistently across all four project foci; and (c) the fact that a number of the categories that had reasonably frequent use appeared within one, or at most two, project foci (products 04, 08, 03, 10, 07, 14, 12, 13, and 11). As such, there is a lot of variability in the cluster category data. Only products that share the characteristics of Reports/Contracts, Data, Data Instruments/Techniques, and Work Management Systems were shared by all project foci with any degree of frequency. Work Specifications/Procedures and Plans/Designs/Theories and Models were the most frequently cited of the categories included in the development focus. Also, it was no surprise to find that diffusion projects produced by far the greatest number of Guides/Manuals and Publications. By and large, the differences observed between RDD&E projects tend to square with differences expected.

TABLE 7.7

The Cluster Categories Used to Describe Products, and Their Distribution by Project Focus

Set DE Coding	Output Cluster Category (Output Structure: Code Set A-1)	Project Focus				Output Totals (20)
	Products	Res. (5)	Dev. (7)	Diff. (5)	Eval. (3)	
01	Reports/Contracts	21	25	47	29	122
04	Work Specifications/Procedures	5	45	21	7	78
27	Data (including printouts)	10	26	25	14	75
02	Data Instruments/Techniques	20	22	18	14	74
08	Plans/Designs/Theories/Models	8	44	14	7	73
05	Work Management Systems	7	20	23	12	62
03	Guides/Manuals	3	18	29	6	56
10	Publications	4	6	36	6	52
07	Resource Lists	2	31	11	0	44
14	Instructnl Units/Use w/Staff	2	4	30	3	39
12	Instructnl Units/In-School	0	26	3	0	29
13	Instructnl Units/Extra-School	0	0	18	0	18
11	Promotional Materials	0	1	16	0	17
28	Taxonomies	0	5	0	0	5
29	Recommendations	0	4	0	0	4
36	Curricular Objectives	0	3	0	0	3
37	Critiques	0	2	1	0	3
06	Data Management Systems	1	0	1	0	2
09	Equipment/Tools/Facilities	0	0	2	0	2
42	Prediction Variables	0	0	0	1	1
	TOTALS	83	282	295	99	759

Events

The nineteen cluster categories used to describe events, and the frequency with which they were used across project foci, are presented in Table 7.8. As will be seen in the table, the use pattern of these categories approximates the use pattern for the categories that describe products, although their frequency of use is much smaller. This coincides, of course, with the smaller number of events identified in the projects studied. Nevertheless, a number of the categories were called upon to describe events that occurred in all project foci (categories 32, 33) or at least three of the four foci (categories 17, 40, 31, 38). Thus,

TABLE 7.8

The Cluster Categories Used to Describe Events, and Their Distribution by Project Focus

Set DE Coding	Output Cluster Category (Output Structure: Code Set A-2)	Project Focus				Output Totals (20)
	Events	Res. (5)	Dev. (7)	Diff. (5)	Eval. (3)	
32	Recruiting/Placing Staff	3	3	10	5	21
33	Collecting/Analyzing Data	4	2	5	5	16
52	Adapting Materials	0	0	12	0	12
43	Establishing Opns Parameters	0	0	9	2	11
17	Workshops/Institutes	3	4	3	0	10
40	Acquiring Supplies/Facilities	2	3	5	0	10
31	Field Trials/Experiments	1	3	3	0	7
38	Training	0	1	2	4	7
51	Acquiring Funds	0	0	6	0	6
48	Maintaining Accountability	2	0	3	0	5
18	Presentations	1	0	2	1	4
19	Benchmark Decisions	2	0	1	1	4
50	Disseminating Info/Outputs	1	0	2	1	4
30	Committee/Consultant Meetings	0	1	1	1	3
15	Staff Meetings	1	0	0	1	2
16	Conferences/Seminars	0	1	1	0	2
39	Updating of Machine Systems	0	1	1	0	2
49	Establishing Field Sites	1	0	1	0	2
47	Coordinating Efforts	2	0	0	0	2
	TOTALS	23	19	67	21	130

Recruiting/Placing Staff, Training Staff, Collecting/Analyzing Data, holding Workshops/Institutes, Acquiring Supplies/Facilities, and carrying out Field Trials/Experiments, are events that constitute relatively common occurrences within the domain of RDD&E. Adapting Materials, Establishing the Parameters of Operations, and oddly enough, Acquiring Funds, were identified as critical events only within diffusion projects. Apart from these differences, the general sense gained from the data presented in Table 7.8 is that had larger numbers of events been identified in the 20 projects studied the use pattern of the event cluster categories would closely follow that of the product cluster categories.

Conditions

Only 12 cluster categories were required to code the primary categories of conditions. These categories, and the frequency with which they were used in classifying conditions by project focus, are presented in Table 7.9.

Approximately the same use pattern will be seen for these categories as was seen for the cluster categories descriptive of products and events. A number of the categories were used across all project foci, a number across three of the four foci, and a number in only one. Also, there were no great surprises as to the nature of the categories used within particular foci. For example, a proper Working Environment/Atmosphere and Cooperative Relationships are conditions that most if not all projects strive to achieve. The reader is sufficiently familiar with the nature of the data appearing in Table 7.9 that further comment about it is necessary.

TABLE 7.9

The Cluster Categories Used to Describe Conditions, and Their Distribution by Project Focus

Set DE Coding	Output Cluster Category (Output Structure: Code Set A-3)	Project Focus				Output Totals (20)
	Conditions	Res. (5)	Dev. (7)	Diff. (5)	Eval. (3)	
21	Working Environment/Atmosphere	3	2	11	3	19
20	Cooperative Relationships	2	5	6	1	14
34	Coordinated Efforts	1	0	8	1	10
22	Quality Assurance	1	3	3	0	7
23	Accountability	2	2	1	1	6
25	Resource Accessibility	1	0	2	1	4
41	Effective Communication	1	1	2	0	4
44	Provision for Services	0	0	2	2	4
45	Informed Public	1	0	0	1	2
26	Available Field Sites	1	0	0	0	1
35	Acceptance/Adoption of Outputs	0	0	1	0	1
46	Trained Staff	0	1	0	0	1
	TOTALS	13	14	36	10	73

The primary contribution of this chapter lies in making explicit the range, form, and substance of those things to which the data in subsequent chapters are linked. As such it provides a view of the broad range of concerns on which work activity is actually targeted in calculated fashion. From this view, the comprehensiveness of the work requirement data contained in the next chapter can be anticipated.

Chapter 8

OUTLINE MAP C: WORK REQUIREMENTS WITHIN EDUCATIONAL RDD&E

This is the third of the three chapters that organize the data collected in the Oregon Studies by project focus, that is by research, development, diffusion, and evaluation. Chapter six provided a summary of the data collected on the people associated with the 20 projects studied; Chapter 7 provided a summary of the outputs of work effort identified within the 20 projects studied; and the present chapter provides a summary of the work requirements data from the 20 projects studied. In terms of the information needed by the designers of personnel development programs, therefore, or by persons entering or working within the field, the data presented in the present chapter may prove to be the most interesting of the three.

The work requirement data to be reported in the chapter pertains to the elements of work associated with the production of the outputs analyzed in the 20 projects studied. It will be recalled from Chapter 4 that three major classes of work data were collected for each output analyzed: (a) the standards held for an output; (b) the tasks involved in producing an output to its specified standards; and (c) the enablers (knowledges, skills, and sensitivities) relied upon or utilized in the production of an output.[1] It will also be recalled that these data were collected in the form of descriptive statements from project staff about the nature of the work required to produce the particular outputs for which they were responsible. These statements were collected through on-site interviews, and subsequently reduced to category codes.[2] Technical definitions of standards, tasks, and enablers, as well as an overview of the codes used in their classification are provided as each of these classes of data is encountered in the pages that follow.

Two sensitivities need to be provided about the data reported in the present chapter. First, work requirement data were obtained for only a sample of the total pool of outputs identified in the 20 projects studied. Of 962 outputs identified, only 298 were analyzed for purposes of identifying work requirements. Since this represents less than a third (31%) of the total number of outputs identified within the 20 projects studied, the adequacy of the sample of outputs analyzed is critical to the adequacy of the work requirement data presented. Because of the criticalness of this issue, attention is directed to the relationship between outputs identified and analyzed before the work requirement data are presented.

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[1] Actually, standards describe an attribute of outputs, but because they influence so directly the work required to produce outputs they have been clustered for reporting purposes as an aspect of work requirement data.

[2] Data obtained by means of questionnaire on the work activities of personnel in the 20 projects studied are reported in Chapter 12.

The second sensitivity that needs to be provided about the work requirement data as they are reported in the present chapter is that they are presented as aggregate data (as if they were independent of the outputs from which they take their meaning). They are reported as standards, tasks, knowledges, etc., that are used within the domain of educational RDD&E without reference to the outputs to which they are linked. While this procedure has the utility of allowing the work requirements that exist within the domain to be "mapped" in outline form, it takes those data out of their appropriate context, and thereby affords the risk of misinterpretation and loss of meaning. The use of the work requirement data in this way is countered in Chapters 10 and 11 where they are presented in terms of their appropriate linkage to outputs.

The Relationship Between Outputs Analyzed and Outputs Identified

As indicated above, the data to be reported in the pages that follow were derived from an analysis of the work requirements associated with the production of 298 of the 962 outputs identified in the 20 projects studied. Tables 8.1, 8.2, and 8.3 provide a summary of the relationship between identified and analyzed outputs. The tables are organized according to the structural properties of outputs, that is, by products, events, and conditions. The data reported within them are in the form of cluster categories (see Chapter 7, pp. 107 to 112). Accordingly, Table 8.1 provides a summary of the cluster categories of products identified and analyzed; Table 8.2 provides a summary of the cluster categories of events identified and analyzed; and Table 8.3 provides a summary of the cluster categories of conditions identified and analyzed.

Three features of the data presented in these tables are noteworthy: (a) the large number of products that have been analyzed as compared to events and conditions; (b) the smaller proportion of identified products analyzed as compared to events and conditions; and (c) the reasonably exhaustive coverage of the categories of outputs identified by those analyzed.

Each of these features needs to be dealt with separately. The imbalance in the number of products, events, and conditions analyzed reflects the imbalance in the number identified. As pointed out in Chapter 7, two factors accounted for this imbalance; the large number of hard products produced within projects, and the fact that in the earlier stages of the Oregon Studies the concept of events and conditions as project outputs did not exist--at least not formally. As a consequence, the majority of outputs identified and thus analyzed in the first 10 projects studied took the form of products.[3]

TABLE 8.1

The Distribution of Outputs Identified and Analyzed
By Product Clusters

Set DE Coding	Output Cluster: Products	Frequency of Outputs	
		Identified	Analyzed
01	Reports/Contracts	122	26
04	Work Specifications/Procedures	78	21
27	Data (including printouts)	75	13
02	Data Instruments/Techniques	74	20
08	Plans/Designs/Theories/Models	73	26
05	Work Management Systems	62	19
03	Guides/Manuals	56	9
10	Publications	52	7
07	Resource Lists	44	13
14	Instructnl Units/Use w/Staff	39	5
12	Instructnl Units/In-School	29	13
13	Instructnl Units/Extra-School	18	3
11	Promotional Materials	17	1
28	Taxonomies	5	2
29	Recommendations	4	--
36	Curricular Objectives	3	--
37	Critiques	3	1
06	Data Management Systems	2	2
09	Equipment/Tools/Facilities	2	--
42	Prediction Variables	1	1
	TOTALS	759	182

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[3] A number of the "products" identified in the early data collection efforts were related to what was called "management responsibilities." Subsequent analyses showed that such "products" were often equivalent to what is now labeled an event or condition. The data collected in the early stages of the Studies have been recoded with the presently existing category sets, and, as a consequence, many of the coding errors introduced in the early data as a result of inadequate categories have been corrected. The fact remains, however, that the total pool of outputs analyzed has been biased by the orientation to outputs held in the early stages of data collection.

TABLE 8.2

The Distribution of Outputs Identified and Analyzed
By Event Clusters

Set DE Coding	Output Cluster: Events	Frequency of Outputs	
		Identified	Analyzed
32	Recruiting/Placing Staff	21	14
33	Collecting/Analyzing Data	16	4
52	Adapting Materials	12	4
43	Establishing Opns Parameters	11	11
40	Acquiring Supplies/Facilities	10	3
17	Workshops/Institutes	10	3
31	Field Trials/Experiments	7	2
38	Training	7	3
51	Acquiring Funds	6	5
48	Maintaining Accountability	5	4
50	Disseminating Info/Outputs	4	4
18	Presentations	4	1
19	Benchmark Decisions	4	2
30	Committee/Consultant Meetings	3	1
15	Staff Meetings	2	--
16	Conferences/Seminars	2	1
39	Updating of Machine Systems	2	2
47	Coordinating Efforts	2	1
49	Establishing Field Sites	2	--
	TOTALS	130	65

Two procedures were followed in an attempt to reduce imbalance. First, unequal proportions of the products, events, and conditions identified were selected for analysis. Thus, approximately 25 per cent of the events, and 70 per cent of the conditions identified were analyzed. While this still did not result in a balance between the three categories of outputs, it is probable that the numbers arrived at through the proportioning process represent a closer approximation to the actual distribution of such outputs within the domain than would otherwise have been obtained. This was judged to be critical from the point of view of collecting work requirement data.

The second procedure followed in attempting to reduce the imbalance between products, events, and conditions introduced through data collection procedures, was an effort to ensure that the range of outputs analyzed was representative of those identified, and that the outputs selected for analysis merited analyzing. In this regard, three decision rules guided the selection of specific outputs to be analyzed: (a) outputs judged to be critical to the operation and/or success of a project by the

TABLE 8.3

The Distribution of Outputs Identified and Analyzed By Condition Clusters

Set DE Coding	Cluster of Outputs: Conditions	Frequency of Outputs	
		Identified	Analyzed
21	Working Environment/Atmosphere	19	15
20	Cooperative Relationships	14	12
34	Coordinated Efforts	10	5
22	Quality Assurance	7	5
23	Accountability	6	5
25	Resource Accessibility	4	1
41	Effective Communication	4	1
44	Provision for Services	4	3
45	Informed Public	2	1
46	Trained Staff	1	1
35	Acceptance/Adoption of Outputs	1	1
26	Available Field Sites	1	1
TOTALS		73	51

staff of that project were given selection priority; (b) outputs that were unique relative to the pool of outputs already analyzed at any point in time were given selection priority; and (c) the number of outputs selected for analysis within any given output cluster category was to reflect the total number of outputs identified within that category. Table 8.4 presents the distribution of outputs identified and analyzed for each of the 20 projects studied. On the basis of the data reported in Tables 8.1 through 8.4 it is believed that the sample of outputs selected for analysis is a reasonably good sample of the outputs produced by the 20 projects studied.

An Overview of the Data Reported In the Chapter

The data reported in this chapter describe the standards, tasks, knowledges, skills, and sensitivities associated with the production of the 298 outputs analyzed. The data were obtained through on-site interviews with 134 professional staff associated with the 20 projects studied. The data base includes 1148 descriptions of standards applied to the 298 outputs; 3722 descriptions of the tasks engaged in to produce the 298 outputs in accordance with the standards held for them; and 2497 descriptions of the knowledges, skills, and sensitivities drawn upon in the production of the 298 outputs. The distribution of these descriptive statements, by project focus, appears in Table 8.5. The average number of such statements

TABLE 8.4

The Distribution of Outputs Analyzed in Relation to Outputs Identified Within Projects

Project Number[a]	Outputs Identified	Outputs Analyzed	Proportion of Outputs Analyzed
1	40	10	.25
2	20	5	.25
3	14	7	.50
4	28	5	.18
5	17	17	1.00
6	67	17	.25
7	48	9	.19
8	15	9	.60
9	30	11	.37
10	65	24	.37
11	22	11	.50
12	18	4	.22
13	67	9	.13
14	44	29	.70
15	70	23	.33
16	57	10	.18
17	57	12	.21
18	47	12	.26
19	205	59	.29
20	32	15	.47

[a] Project numbers listed here coincide with the number given projects in the case profiles contained within Volume IV of the series reporting the Oregon Studies.

per output analyzed appears in Table 8.6. In combination, these two tables provide the reader with some sense of the data base called upon in the analyses presented in the chapter.

As in the case of project output data (see Chapter 7) task data are reported in terms of both primary and cluster categories. The other classes of work requirement data did not contain a sufficient number of primary categories to warrant clustering. The number of primary and cluster categories developed around standard, task (including cluster categories), and enabler statements, and the application of those categories by project foci, are presented in Table 8.7.

TABLE 8.5

The Frequency and Distribution By Project Focus of the Standard, Task, and Enabler Statements Elicited For the 298 Outputs Analyzed

Category Code	Variable	Project Focus				Total (20)
		Res (5)	Dev (7)	Diff (5)	Eval (3)	
J	Standards	136	453	399	160	1148
J 1	Output	93	358	217	107	775
J2	Processes/Operations	43	95	182	53	373
NOQR	Tasks	433	1290	1411	588	3722
S	Enablers	318	912	824	443	2497
S 1	Knowledges	148	325	326	165	964
S 2	Skills	89	323	281	155	848
S 3	Sensitivities	81	264	217	123	685

TABLE 8.6

The Average Number (Approximate) of Standard, Task, and Enabler Statements Elicited Per Output Analyzed Within Each Project Focus

Category Code	Variable	Project Focus				Total (20)
		Res (5)	Dev (7)	Diff (7)	Eval (3)	
Number of Outputs Analyzed		44	111	108	35	298
J	Standards	3	4	4	5	4
J 1	Output	2	3	2	3	2.5
J 2	Processes/Operations	1	1	2	2	1.5
NOQR	Tasks	10	12	13	17	12
S	Enablers	7	8	8	13	8
S 1	Knowledges	3	3	3	5	3
S 2	Skills	2	3	3	4	3
S 3	Sensitivities	2	2	2	4	2

TABLE 8.7

The Number of Primary and Cluster Categories Used to Describe Work Requirements Within RDD&E Projects

Category Code	Variable	Number of Categories Derived	No. of Categories Used			
			Res (5)	Dev (7)	Diff (5)	Eval (3)
J	Standards	79	42	58	68	44
J1	Output	33	23	27	29	23
J2	Process	46	19	30	39	21
NOQR	Tasks					
QR	Primary	280	129	197	209	150
NO	Cluster	20	19	19	20	19
S	Enablers	136	75	115	108	95
S1	Knowledges	29	21	24	22	24
S2	Skills	49	26	40	44	36
S3	Sensitivities	58	28	51	42	35

Standards Applied to Outputs

For each output analyzed in the Oregon Studies, statements were sought from interviewees regarding the standards used to judge its adequacy, and the adequacy of the processes involved in its production. As a result, two sets of standards having significance in the production of each of the 298 selected outputs were obtained, one pertaining to the adequacy of outputs themselves and one pertaining to the adequacy of the processes and operations associated with their production. As used in the Oregon Studies the concept of standard was defined generally as "a criterion applied to, or level of excellence expected of an output."

To organize the 1148 standards cited, 79 primary categories of standards were derived. Of the 79 categories, 33 applied to output standards and 46 applied to process standards. The primary categories falling within each of these two category sets, and the frequency with which each category within each set was applied to the classification of statements descriptive of standards held within project foci, are displayed in Appendix 4. The reader is encouraged to peruse this appendix carefully for it displays the full range of standards data identified within the 20 projects studied.

In the pages that follow attention is directed only to the most frequently used categories of standards. While such a strategy obviously ignores much that is contained in Appendix 4, it has been adopted on the basis of economy and the assumption that the most meaningful search of the data for similarities and differences by project focus rests with categories that have a high frequency of use. The data reported in the following paragraphs are reported separately for output and process standards.

Output Standards

Table 8.8 displays the five most frequently appearing categories of output standards, and the frequencies with which they were applied within project foci. The fact that 45 per cent of all standards identified were classified within five categories, and that 38 categories were required to classify the remaining standards statements, gives an indication of the range of standards that exist.

TABLE 8.8

The Five Categories Used Most Frequently to Classify the Standards Applied to Outputs of Educational RDD&E Projects

Set LM Coding	Primary Categories of Output Standards	Project Focus				Total (20)
		Res (5)	Dev (7)	Diff (5)	Eval (3)	
12	Goal attainment	18	35	31	18	102
13	Acceptance by others (in proj)	10	38	14	15	77
01	Completeness of content	10	29	18	3	60
06	Acceptance by users	0	19	35	3	57
05	Utility or value	1	28	19	7	55
Total number of output standards coded with the five categories		39	149	117	46	351
Total number of output standards		93	358	217	107	775
Percentage of output standards coded with the five categories		42%	42%	54%	43%	45%

The data included in Table 8.8 gives evidence of the existence of both similarities and differences in the standards applied to outputs across RDD&E. Similarities are evidenced by the fact that the five categories of standards cited accommodated about the same proportion of standards statements identified within all project foci. Also, personnel in all project foci appear to be concerned with achievement of goals and the acceptance of work by others in the project. Beyond this, however, similarities across project foci appear to diminish rapidly.

As might be expected, personnel in diffusion projects are concerned with the acceptance of their outputs by users. By contrast, personnel in research projects, and, to a lesser extent, evaluation projects, appear relatively unconcerned about whether their products are accepted by users. While personnel in all other foci place some importance on the utility or value of their outputs, personnel in research projects appear relatively unhampered by such standards.

Table 8.9 provides a closer look at the standards considered most critical within educational RDD&E projects. Again, the five most frequently used categories of output standards are presented, but this time they are listed for each project focus separately. As would be expected, the data in this table tend to reflect those in Table 8.8. Several new standards appear in Table 8.9, however, which add clarity to the nature of the standards applied to outputs by personnel in differing project areas.

One of the output standards listed in Table 8.9 that does not appear in Table 8.8 is that of Personal Satisfaction/Feeling. This was held by personnel in both research and development projects. A standard held only by researchers had to do with an output Functioning as Planned. It is interesting that while research personnel seem to pay little attention to standards of utility or acceptance by users, they do attend to standards that pertain to feelings of satisfaction and having outputs function as planned.

Personnel in evaluation projects appear to rely more upon standards that reflect the appropriateness of or accuracy in their efforts than do other project personnel. Categories of standards appearing in Table 8.9 for evaluation projects that did not appear in Table 8.8, relate to the precision with which outputs are produced (Lack of Errors/Discrepancies) and the importance of appropriate design and content for the production of outputs. The standards most frequently cited by personnel working within diffusion projects are the same as those listed in Table 8.8.

One further analysis of the categories used most frequently to classify output standards is presented. In this analysis the categories of standards appearing in Tables 8.8 and 8.9 have been combined, and the percentage of the total set of standards occurring within them, by project focus, has been calculated. These data are displayed in Table 8.10.

Two observations about the data presented in Table 8.10 merit consideration. First, the standards added to those appearing in Table 8.8 account for a sizable increase in the percentage of standards statements classified. This is especially the case in evaluation projects where the percentage moves from 45 to 82 per cent. Even with the added standards, however, a substantial proportion of the standards statements identified are classified by other categories. This again speaks to the range of standards data and reinforces the desirability of carefully reviewing Appendix 4. The second observation is that the four added standards appear to have meaning within all project foci. In only one instance did any of the added categories of standards account for the classification of less than three per cent of the total set of standard statements identified within project focus.

TABLE 8.9

The Five Most Frequently Used Categories of Output Standards Within Project Foci, Their Frequency of Use, and the Percentage of Standards Statements Coded Within Them

Set LM Coding	Primary Categories of Output Standards	Freq of Use	% of Standards Statements Coded
	Research Focus (5 Projects)		
12	Goal attainment	18	19%
13	Acceptance by others (in project)	10	11
01	Completeness of content	10	11
07	Personal satisfaction or feeling	8	9
22	Functions as planned	6	6
	Totals (5 categories)	52	56%
	Development Focus (7 Projects)		
13	Acceptance by others (in project)	38	10
12	Goal attainment	35	10
01	Completeness of content	29	8
05	Utility or value	28	8
07	Personal satisfaction or feeling	28	8
	Totals (5 categories)	158	44%
	Diffusion Focus (5 Projects)		
06	Acceptance by users	35	16
12	Goal attainment	31	14
05	Utility or value	19	9
01	Completeness of content	18	8
13	Acceptance by others (in project)	14	7
	Totals (5 categories)	117	54%
	Evaluation Focus (3 Projects)		
12	Goal attainment	18	16
13	Acceptance by others (in project)	15	14
11	Appropriate design/content	10	9
05	Utility or value	7	7
09	Lack of errors/discrepancies	7	7
	Totals (5 categories)	57	53%

TABLE 8.10

The Nine Categories Used Most Frequently to Classify Standards Applied to the Outputs of Educational RDD&E, and the Percentage of Standards Statements Coded Within them by Project Focus

Set LM Coding	Primary Categories of Output Standards	Project Focus				Total (20)
		Res. (5)	Dev. (7)	Diff. (5)	Eval. (3)	
12	Goal Attainment	19%	10%	14%	16%	13%
13	Acceptance by others (in proj)	11	10	7	14	10
01	Completeness of content	11	8	8	6	8
06	Acceptance by users	0	5	16	6	7
05	Utility or value	1	8	9	7	7
07	Personal satisfaction/feeling	9	8	4	4	6
09	Lack of errors/discrepancies	3	6	3	7	5
22	Functions as planned	6	4	4	13	5
11	Appropriate design/content	1	3	5	9	4
Percentage of all output standards included within these categories		61%	62%	70%	82%	65%

Process Standards

Process standards are treated in the paragraphs that follow in the same manner that output standards have been treated. Table 8.11 contains the five most frequently used categories of process standards, Table 8.12 contains the five most frequently used categories within each project focus, and Table 8.13 displays the percentage of standards classified within each project focus by the categories listed in Tables 8.12 and 8.13.

As can be seen from Table 8.11, there does not appear to be as much sharing of process standards across project foci as was the case with output standards. With the exception that the five categories account for approximately the same proportion of classifications within each project focus (see the bottom line of the table) the process standards that personnel in one focus hold as important are held to be either more or less important in other foci. With the possible exception of deadlines being met, no single process standard appears to be of equal or similar importance across foci.

The data presented in Table 8.12 add further clarity to this point, for seven new categories of standards appear within it. Furthermore, of the 12 process standards listed in the table, only that of meeting deadlines occurs prominently in as many as three foci. No other process standard appearing in the table is shared by more than two project foci.

TABLE 8.11

The Five Categories Used Most Frequently to Classify the Standards Applied to Processes in Educational RDD&E Projects

Set LM Coding	Primary Categories of Process Standards	Project Focus				Total (20)
		Res. (5)	Dev. (7)	Diff. (5)	Eval. (3)	
34	Impact of effort favorable	3	5	16	10	34
17	External enthusiasm evident	6	4	20	2	32
04	Deadlines are met	5	9	9	6	29
13	Work conducted within budget	2	7	18	1	28
36	Employment criteria met	1	6	17	0	24
Total number of process standards coded with the five categories		17	31	80	19	147
Total number of process standards		43	95	182	53	373
Percentage of process standards coded with the five categories		40%	33%	44%	36%	39%

In reviewing the data in Table 8.12 at another level of detail, it can be seen that personnel in research projects emphasize four process standards that are emphasized by personnel in other foci. Surprisingly, in light of the output standards discussed previously, research personnel hold process standards relating to external enthusiasm to be of major importance. This seems somewhat contradictory in light of their apparent lack of concern with output standards relating to acceptance by users. Not so surprisingly, however, the concern for external enthusiasm is shared by personnel in diffusion projects, and seemingly with the same degree of emphasis. Research personnel, like development and evaluation personnel, are also concerned with meeting deadlines, with achieving an acceptable level of output, and with ensuring that an expected activity occurs. Based on the data presented in the table, research personnel uniquely emphasize cooperation of personnel as a standard of excellence to be applied to project operations.

Personnel in development projects share with personnel in diffusion projects sets of standards related to staying within the budget, and with seeing to it that personnel being hired meet appropriate criteria. The uniqueness of development personnel lies in their willingness to use as a standard for judging process feelings that no deficiencies exist in that which they are doing.

TABLE 8.12

The Five Most Frequently Used Categories of Process Standards Within Project Foci, Their Frequency of Use, and the Percentage of Standards Statements Coded Within Them

Set LM Coding	Primary Categories of Process Standards	Freq of Use	% of Standards Statements Coded
	Research Focus (5 Projects)		
17	External enthusiasm evident	6	14
04	Deadlines are met	5	12
01	Personnel cooperate	3	7
05	Acceptable level of output	3	7
07	An expected activity occurs	3	7
	Totals (5 Categories)	20	47%
	Development Focus (7 Projects)		
04	Deadlines are met	9	10
13	Work conducted within budget	7	7
05	Acceptable level of output	6	6
36	Employment criteria met	6	6
14	No felt deficiencies	5	5
	Totals (5 Categories)	33	34%
	Diffusion Focus (5 Projects)		
17	External enthusiasm evident	20	11
13	Work conducted within budget	18	10
36	Employment criteria met	17	9
15	Tasks perceived and acted upon	16	9
34	Impact of effort favorable	16	9
	Totals (5 Categories)	87	48%
	Evaluation Focus (3 Projects)		
34	Impact of effort favorable	10	19
04	Deadlines are met	6	11
32	Resources (info) avail on request	5	9
07	An expected activity occurs	4	8
35	Outputs distributed/requested	4	8
	Totals (5 Categories)	29	55%

Personnel in diffusion projects once again reflect standards held in common by all other RDD&E project personnel studied, that is, the standards listed for diffusion projects in Table 8.12 are with one exception the standards appearing in Table 8.11. Only in their reliance upon the ability to perceive and act upon tasks involved in their work do diffusion personnel differ from personnel in other project foci in the process standards held.

Personnel in evaluation projects appear most unique in terms of the process standards they act upon. They emphasize two standards that are not emphasized by others, and, for the standards that they do share with others, the degree of emphasis differs. The two sets of standards emphasized by evaluation personnel and not others are, having available to users at the time it is needed materials and/or information they require, and having outputs requested and distributed. By a considerable margin, however, standards relating to the favorable impact of their efforts are of greatest concern.

The data presented in Table 8.13 reinforce the differences observed in Table 8.12 with respect to the process standards held across project foci.

TABLE 8.13

The Twelve Categories Used Most Frequently to Classify the Process Standards Applied in Educational RDD&E, and the Percentage of Standards Statements Coded Within Them By Project Focus

Set LM Coding	Primary Categories of Process Standards	Project Focus				Total (20)
		Res (5)	Dev (7)	Diff (5)	Eval (3)	
34	Impact of effort favorable	7%	5%	9%	19%	9%
17	External enthusiasm evident	14	4	11	4	9
04	Deadlines are met	12	10	5	11	8
13	Work conducted within budget	5	7	10	2	8
36	Employment criteria met	2	6	9	0	6
15	Tasks perceived and acted upon	0	2	9	0	5
05	Acceptable level of output	7	6	2	6	4
07	An expected activity occurs	7	1	2	8	3
14	No felt deficiencies	2	5	3	0	3
01	Personnel cooperate	7	1	2	2	2
32	Resources available on request	0	0	1	9	2
35	Outputs distributed/requested	0	0	1	8	2
Percentage of all process standards included within these categories		63%	47%	64%	69%	61%

In summarizing the standards data, the finding that is most striking is the contrast between the similarity in standards emphasized by RDD&E personnel in relation to outputs and the difference in standards emphasized in relation to processes and operations. RDD&E personnel working within differing project foci seem to apply approximately the same standards to the outputs of their work effort, but considerably different standards to the processes involved in producing those outputs. It is unclear why this should be so, unless for some reason the outputs produced within varying project foci involve sufficiently different operations for their production that different process standards have to be brought to bear. In light of the data reported in the next section of the chapter, however, this does not appear to be a particularly promising hypothesis.

Tasks Involved in Output Production

As used in the Oregon Studies, a task is defined as "the unit of work performed in producing a specified output to a specified standard." In terms of the conceptual framework that guided data collection within the Studies, tasks were seen as one of three hierarchically ordered descriptors of work effort. The largest or most inclusive descriptor was labeled activity, the next largest, task, and the next, action. Operationally this three-level classification scheme reflects the simple recognition that work effort may be treated in larger or smaller units depending upon the size of the output chosen for analysis, and that it would be desirable to eliminate as much of the arbitrariness in that variability as possible. For a number of reasons such distinctions were never made in the Oregon Studies and "tasks" became the only unit of analysis used in describing work effort within a project.[4]

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[4] Two factors prevented the description of work effort at the level of activities, tasks, and actions: (a) the inability to arrive at satisfactory decision rules for determining size or level of output as a starting point for the analysis of work effort; and (b) the lack of a resource base that would permit the analysis of work effort at an extremely detailed level, i.e., the level of action. Given these constraints the decision was made to permit activities, tasks, and actions to be differentiated empirically rather than conceptually. Operationally, the plan was to involve the collection of descriptions of work effort, under the label of tasks, without regard to the inclusiveness of the work effort being described, and then analyze the total pool of task statements with a view to sorting them on the basis of their level of generality. Labels such as activities, tasks, and actions--or some other set--could then be applied to the differentiated levels of work activity. The data collection phase of the plan has been completed; the follow on analysis has not.

The concept of task, as used in the Oregon Studies, involves two additional elements that are critical to its understanding: The linkage of tasks to outputs, and the influence that standards held for outputs have upon tasks to be performed. Tasks are always identified in relation to the production of a particular output, and the nature of the tasks to be performed are always a function of the standards held for that output. The tasks required to develop a test to measure understanding of human development, for example, are quite different from the tasks involved in developing a conference designed to lead to increased understanding of human development. In addition, if the standards held for a test are rigorous, for example, evidence of item discrimination, evidence of stability of measurement over time, etc., as opposed to being less rigorous, the tasks to be engaged in vary considerably. If the standards for a conference are such that participants must show evidence of learning gains during the conference, show evidence of activities that follow from the conference, etc., the tasks involved in the development and operation of the conference are much different than if less stringent standards were held.[5]

The data on tasks represents the largest single set of data within the Oregon Studies. Three thousand, seven hundred twenty-two separate statements describing tasks performed in relation to the 298 outputs analyzed were developed to classify the task statements in terms of their similarities and differences at a "close to the source" level (primary categories), and 20 further categories were developed to classify the 380 primary categories (cluster categories). Both the primary and cluster category sets were developed for tasks in much the same way as were categories for outputs (see Chapter 4, pp 53 to 56).[6] A full listing of the primary task categories ordered by the task clusters in which they fall appear as Appendix 6. The 20 task cluster categories, the number of primary task categories contained within each cluster category, and the number of task statements that have been coded as falling within each cluster category, are presented in Table 8.14.

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[5] As indicated previously, while such interaction exists between outputs, standards, and tasks, the data presented in the present chapter on tasks are presented as if they were independent of these interactions. The reader needs to interpret the data accordingly.

[6] A difference that exists in the category sets for tasks and outputs, however, is the nature of the linkage between primary and cluster categories within each set. As presently constructed, primary task categories are restricted to a single task cluster. This is not the case with outputs, for there primary output categories can link to any cluster category. The fixed relationship between primary and cluster categories of tasks is a function of beginning the category development process for tasks with preconceived category sets, and the accompanying decision rule that required all primary categories to be linked to a specific cluster category.

TABLE 8.14

The Number of Task Statements and Primary Task Categories Contained Within Each Cluster Task Category

Set NO Coding	Task Cluster Categories	Number of Primary Task Categories	Number of Task Statements
04	Producing the output	17	474
05	Collecting/processing data	19	342
06	Assessing the output quality	17	337
22	Effecting accountability	32	314
03	Designing the output	20	300
24	Effecting quality control	24	298
01	Clarifying problem addressed	16	297
29	Facilitating relationships	18	225
31	Diffusing info. within project	15	205
21	Procuring professional staff	19	201
23	Procuring systems/services	9	199
02	Formulating objectives	7	141
25	Maintaining job satisfaction	15	124
33	Effecting decision mechanisms	10	67
30	Effecting info. flow patterns	8	61
26	Facilitating growth of staff	6	47
32	Diffusing info. beyond project	11	40
07	Diffusing the output	10	36
27	Enhancing physical environment	4	8
28	Maintaining equity among staff	3	6
	Totals	280	3722

As can be seen from the table, task cluster categories tend to be extremely general in nature, and tend to subsume a relatively large number of primary task categories and task statements. While useful for purposes of organizing large quantities of data, their generality and inclusiveness make them poor vehicles for displaying the nature of the task data collected in the Studies. Because of the relatively large frequencies involved, the primary task categories make better display vehicles. In keeping with the strategy of adopting high frequency categories for purposes of cross-project analysis and discussion, as was done with standards, the ten most frequently used categories of tasks across all projects studied are presented in Table 8.15.

TABLE 8.15

The Ten Categories Used Most Frequently to Classify the Tasks Engaged in Within Educational RDD&E Projects

Set NO QR Coding	Primary Categories of Tasks	Project Focus				Total (20)
		Res. (5)	Dev. (7)	Diff. (5)	Eval. (3)	
04 02	Construct/assemble components	17	97	75	36	225
06 14	Note/make modifications	7	90	47	14	158
01 12	Review existing materials	12	42	44	12	110
23 05	Negotiate contract/cooperation	7	22	63	3	95
05 02	Administer data instruments	12	22	37	8	79
04 05	Produce the output	7	31	29	10	77
03 10	Specify/identify charac of mat	4	43	21	9	77
02 07	Confer w/colleagues re obj	11	35	16	15	77
25 01	Specify/explain agcy/project psn	0	2	63	4	69
24 11	Proof/critique products/perform	2	16	34	9	61
Total number of task statements coded within the ten categories		79	400	429	120	1028
Total number of task statements		433	1290	1411	588	3722
Percentage of task statements coded within ten categories		18%	31%	30%	20%	28%

It will be seen from the data presented in the table that the ten categories used most frequently to classify the tasks engaged in within educational RDD&E do not begin to represent the range of tasks identified by the Oregon Studies. In no project focus do the ten categories account for as much as a third of the tasks identified. It will also be seen that the task categories listed receive greater use in classifying work efforts within development and diffusion projects than within research and evaluation projects, a fact accounted for in large part by the absolute number of task statements identified within development and diffusion projects. Because of the extensiveness of the task data collected (another 270 primary task categories used in coding 72% of the task statements are not mentioned in Table 8.15), and because of the wide variation of tasks performed within RDD&E projects, the reader is encouraged to peruse Appendix 6 carefully. Only a glimpse of the data within it can be provided in the next few pages.

The most frequently cited task category in all project foci was that of constructing or assembling the components of an output. As used within the Oregon Studies, this category pertains to the fabrication of an output, or its pieces and parts. It refers to the somewhat mechanical task of actually putting an output together after all else in its development has been done. As such, it's an activity common to all project foci.

The next most frequently appearing task, and one that is closely related to the first, is that of modifying an output. As would be expected, the category was most frequently used in classifying work effort within development and diffusion projects, but it also appears in research and evaluation projects. When these two categories are combined with the task "Producing the Output," i.e., making multiple copies of an output available, it is clear that a great deal of work effort is directed in RDD&E projects, especially development and diffusion projects, to an out and out production function. This becomes even more apparent if the tasks Review Materials, Specify the Character of Materials to be Produced, and Proof or Critique a Product and/or its Performance are added to the list. It is true of course that the data reported in Table 8.15 are influenced heavily by the preponderance of the tasks reported being identified within development and diffusion projects, but the data hold reasonably well across all project foci.

With one exception the data presented in Table 8.15, at a gross level, pattern reasonably well. Except for the category Explaining the Position of a Project or Agency to Others, all ten categories tend to be used more frequently in classifying work activities identified in development and diffusion projects than in research and evaluation projects. That is the case both for the absolute number of times used and the proportion of work activities classified. Within the limits of the data, then, it is possible to say that personnel in development and diffusion projects tend to engage in similar kinds of work activities, and that personnel in research and evaluation projects tend to engage in similar kinds of work activities. All four foci engage in common tasks but with differing degrees of emphasis.

Within this gross pattern, however, there is a great deal of variability. In six of the ten categories, for example, the difference in frequency of use between development and diffusion projects is half or more. The same statistic holds for research and evaluation. Thus, while development and diffusion seem to share reasonably common work requirements at one level, and research and evaluation seem to do the same, at another level all foci seem to engage in the execution of tasks that assume somewhat idiosyncratic patterns. The reader is urged to pursue such analyses by use of the data presented in Appendix 6.

Table 8.16 provides a closer look at the work activities most frequently engaged in within educational RDD&E. In this table the five categories used most frequently to classify work activities identified within project foci are displayed. As would be expected from the data in Table 8.15, no new categories of work activity appeared in Table 8.16 for development and evaluation projects. The five most frequently used categories of work effort within both of these areas were subsumed within the ten most frequently used categories within the domain as a whole; at least

TABLE 8.16

The Five Most Frequently Used Categories of Tasks Engaged in Within Project Foci, Their Frequency of Use, and the Percentage of Task Statements Coded Within Them

Set NO QR Coding	Primary Categories of Tasks	Freq. of Use	% of Standards Statements Coded
	Research Focus (5 Projects)		
04 02	Construct/assemble components	17	4%
05 02	Administer data instruments	12	3
01 12	Review existing materials	12	3
02 07	Confer w/colleagues re objectives	11	2
29 14	Interact w/setting to collaborate	9	2
	Totals (5 categories)	61	14%
	Development Focus (7 Projects)		
04 02	Construct/assemble components	97	8%
06 14	Note/make modifications	90	7
03 10	Specify/identify charac of material	43	3
01 12	Review existing materials	42	3
02 07	Confer w/colleagues re objectives	135	3
	Totals (5 categories)	407	24%
	Diffusion Focus (5 Projects)		
04 02	Construct/assemble components	75	5%
23 05	Negotiate contract/cooperation	63	5
25 01	Specify/explain agcy/project psn	63	5
06 14	Note/make modifications	47	3
01 12	Review existing materials	44	3
	Totals (5 categories)	292	21%
	Evaluation Focus (3 Projects)		
04 02	Construct/assemble components	36	6%
02 07	Confer w/colleagues re objectives	15	3
06 14	Note/make modifications	14	2
04 01	Construct/assemble msmt tools	14	2
22 04	Establish/maintain time lines	13	2
	Totals (5 categories)	92	15%

as the domain was sampled by the 20 projects studied. New categories descriptive of work effort within research and evaluation projects do appear in Table 8.16, however. The category Interacting with Persons in a Setting to Obtain their Collaboration, and the categories Constructing Measurement Tools and Establishing and Maintaining Time Lines, reflect work efforts that appear more frequently in research and evaluation projects, respectively, than within the domain of RDD&E as a whole. Interestingly, the column in Table 8.16 showing percentages indicates that no task category accounts for more than eight per cent of the task statements identified within any project focus, and that by the time the fifth most frequently used category is displayed the per cent of the task statements incorporated dwindles to three per cent or less. When the 13 different categories that appear in Tables 8.15 and 8.16 are combined, as they are in Table 8.17, the percentage of task statements they account for diminishes even more dramatically. Considering the large number of task categories that remain unreported (267), and the percentage of task statements they incorporate, the range of work activities encountered within the domain of

TABLE 8.17

The Thirteen Categories Used Most Frequently to Classify the Tasks Engaged in Within Educational RDD&E, and the Percentage of Task Statements Coded Within Them By Project Focus

Set NO QR Coding	Primary Categories of Tasks	Project Focus				Total (20)
		Res. (5)	Dev. (7)	Diff. (5)	Eval. (3)	
04 02	Construct/assemble components	4	8	5	6	6%
06 14	Note/make modifications	2	7	3	2	4
01 12	Review existing materials	3	3	3	2	3
23 05	Negotiate contract/cooperation	2	2	4	1	3
05 02	Administer data instruments	3	2	3	1	2
04 05	Produce the output	2	2	2	2	2
03 10	Specify/identify charac of matter	1	3	1	2	2
02 07	Confer w/colleagues re objectives	3	3	1	3	2
25 01	Specify/explain agcy/project psn	0	-	4	1	2
24 11	Proof/critique products/perform	-	1	2	2	2
29 14	Interact w/setting to collaborate	2	1	2	2	1
22 04	Establish/maintain time lines	4	1	-	2	1
04 01	Construct/assemble msmt tools	1	1	1	2	1
Percentage of all task statements included within these categories		27%	34%	31%	28%	31%

educational RDD&E can begin to be appreciated. Again, the reader is urged to study Appendix 6 carefully in this regard.[7]

Knowledges, Skills, and Sensitivities Called Upon in Output Production

Within the context of the Oregon Studies, knowledges, skills, and sensitivities were seen as "enablers" of task performance. As such, they were seen as prerequisites to output production and, for purposes of economy in data collection, were linked directly to outputs.[8] As used in the Oregon Studies knowledge, skill, and sensitivity were defined as follows:

Knowledge	- A classification given an enabler that identifies it as a fact, principle, or generalization that can stand the test of empirical verification; also, any circumstance that can be shown to exist.
Skill	- A classification given an enabler that identifies it as an ability, proficiency, or expertness in the exercise of an art, craft, or science.

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[7] With the range and variability that exist in work activities (tasks) within the domain of educational RDD&E, some means must be found to cluster them meaningfully. Two such efforts are reported in the present volume: (a) the cluster categories that classify the 280 primary categories of work activity (see Table 8.14, p. 130); and (b) the linkage of work activities to outputs (see Chapters 10 and 11). A number of additional analyses could be undertaken in this regard now that the task data are available in final form. These should include formal factorial studies, further conceptual analyses, and the completion of the output work requirement analyses introduced in Chapters 10 and 11.

[8] This was recognized as a grosser linkage than desired, but because of the extremely large number of task statements identified, time and resource limitations, and the tendency to find the same enablers serving multiple tasks, the decision was made to link enabler data directly to outputs rather than to the tasks engaged in to produce outputs. One consequence of this decision was the problem it posed in distinguishing between task and skill statements. Since task statements were always elicited from interviewees first, however, and the same interviewees provided the skill data, it was possible to eliminate overlap between such statements with respect to any particular output. When looking at task and skill statements across outputs, however, some overlap appears. The pros and cons of linking enablers to tasks as opposed to outputs should be investigated further.

Sensitivity - A classification given an enabler that identifies it as an increment of awareness about an environment or factors operating in or upon an environment; also, attitudes and personality characteristics.

Examples of knowledge include standard school subjects, the subject matter of RDD&E, resource availability, and staff responsibilities; examples of skill include writing, facilitating people interactions, using equipment or systems, and exercising judgment; and examples of sensitivity include an awareness of staff capabilities and limitations, awareness of needs of self and others, awareness of potential conflict of interests, and feelings of personal security.

A total of 2,497 enabler statements, as opposed to 3,722 task statements, were collected.[9] Of this total 964 were knowledge statements, 848 were skill statements, and 685 were sensitivity statements. These statements, in turn, were grouped into 29 primary categories of knowledge, 49 primary categories of skill, and 58 primary categories of sensitivity. These three sets of categories appear, respectively, in Appendices 7, 8, and 9. No cluster categories were developed for any of the three. The percentage distribution of the three classes of enabler statements, by project focus, is shown in Table 8.18.

TABLE 8.18

The Percentage Distribution of Knowledge, Skill, and Sensitivity Statements Within Project Foci

Set S Coding	Structure of Enabler	Project Focus				Total (20)
		Res. (5)	Dev. (7)	Diff. (5)	Eval. (3)	
1	Knowledge	47%	36%	40%	37%	39%
2	Skill	28	35	34	35	34
3	Sensitivity	25	29	26	28	27
TOTALS		100%	100%	100%	100%	100%

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[9] It is somewhat surprising that the number of enabler statements was less than the number of task statements. It is unclear whether this was a function of the way in which enabler statements were identified, that is, linked directly to outputs rather than the tasks engaged in to produce outputs, or whether it was a function of a limited set of knowledges, skills, and sensitivities being drawn upon in multiple combinations in the performance of a wide range of tasks. From a training standpoint this becomes a critical issue, and in subsequent studies should be resolved.

Enabling Knowledges

To continue the pattern of analysis established in the previous pages, the five categories most frequently used to classify the knowledges drawn upon in the 20 projects studied are displayed in Table 8.19. Table 8.20 displays the five categories of knowledge most frequently drawn upon within each project focus.

TABLE 8.19

The Five Categories Used Most Frequently to Classify the Knowledges Drawn Upon in Educational RDD&E Projects

Set UV Coding	Primary Categories of Enabling Knowledges	Project Focus				Total (20
		Res (5)	Dev (7)	Diff (5)	Eval (3)	
06	Project variables: external	29	38	81	9	157
03	Subjects related to RDD&E	38	34	22	50	144
04	Technical/professional topics	14	56	44	22	136
08	Project operation: specific	12	40	36	8	96
07	Project operation: general	7	22	19	5	53
Total number of knowledge statements coded within the categories		98	190	202	94	586
Total number of knowledge statements		148	325	326	165	964
Percentage of knowledge statements coded with the five categories		68%	58%	62%	57%	61%

As can be seen in Table 8.19 knowledge of circumstances that surround a project are drawn upon as frequently in project operation as knowledge associated with the technical aspects of the field. In combination, the three categories of knowledge appearing in the table that focus upon external and internal conditions affecting project operation are used as frequently as the two categories of knowledge that focus upon professional and discipline related topics. On the basis of the data reported in Appendix 7, this is a pattern that characterizes the knowledge data as a whole. As such, it has major implications for training, for if taken at face value it means that knowledge specific to projects is as critical to project operation as is knowledge that is generalizable across projects. Because of the generality of the knowledge categories, the reader may wish to trace the specific knowledge items incorporated within them by referring to the appendices within the case profiles (see Volume IV of the series of volumes reporting the Oregon Studies).

TABLE 8.20

The Five Most Frequently Used Categories of Knowledge Within Project Foci, Their Frequency of Use, and the Percentage of Knowledge Statements Coded Within Them

Set UV Coding	Primary Categories of Enabling Knowledges	Freq of Use	% of Knowledge Statements Coded
	Research Focus (5 Projects)		
03	Subjects related to RDD&E	38	26
06	Project variables: external	29	20
04	Technical/professional topics	14	9
08	Project operation: specific	12	8
05	Project focus topics: external	11	7
	Totals (5 Categories)	104	70%
	Development Focus (7 Projects)		
04	Technical/professional topics	56	17
08	Project operation: specific	40	12
06	Project variables: external	38	12
03	Subjects related to RDD&E	34	10
07	Project operation: general	22	7
	Totals (5 Categories)	190	58%
	Diffusion Focus (5 Projects)		
06	Project variables: external	81	25
04	Technical/professional topics	44	13
08	Project operation: specific	36	11
03	Subjects related to RDD&E	22	7
07	Project operation: general	19	6
	Totals (5 Categories)	202	62%
	Evaluation Focus (3 Projects)		
03	Subjects related to RDD&E	50	30
04	Technical/professional topics	22	13
02	Subjects learned in courses (gen)	13	8
24	Process/implementation (project)	11	7
05	Project focus topics: external	9	6
	Totals (5 Categories)	105	64%

While the five knowledge categories listed in Table 8.19 are distributed across all project foci, different emphases within foci are apparent. For both research and evaluation personnel, knowledge of subjects related to RDD&E appear to be drawn upon most frequently. Personnel in diffusion projects seem to pay particularly close attention to knowledge of factors external to project operations, while personnel in development projects seem to draw particularly heavily upon technical and professional topics. On the whole, however, the data from Table 8.19 suggest that the same general classes of enabling knowledges are required of personnel in all project foci. This commonality is reported by categories, however, and it is necessary to review the data in the profile appendices contained in Volume IV to identify possible differences.

Table 8.20 represents an extension of Table 8.19 in that it displays the five categories of knowledge drawn upon most frequently within each project focus. Two observations about the data displayed in the table are noteworthy: (a) the five categories of knowledge most frequently drawn upon in the field as a whole are the five categories most frequently drawn upon in development and diffusion projects, although in somewhat different order; and (b) personnel in evaluation projects tend to rely more heavily upon substantive knowledge, and less heavily upon knowledge of project operations, than personnel in any other project focus. To some extent research personnel shared in this emphasis upon the substantive, as evidenced by the appearance in Table 8.20 of the category Project Related Topics, but not so heavily as evaluation personnel. The similarities and differences in the extent to which project foci rely upon various categories of knowledge are highlighted by the data displayed in Table 8.21.

TABLE 8.21

The Eight Categories Used Most Frequently to Classify
the Knowledges Drawn Upon in Educational RDD&E,
and the Percentage of Knowledge Statements
Coded Within Them By Project Focus

Set UV Coding	Primary Categories of Enabling Knowledges	Project Focus				Total (20)
		Res. (5)	Dev. (7)	Diff. (5)	Eval. (3)	
06	Project variables: external	20%	12%	25%	5%	16%
03	Subjects related to RDD&E	26	10	7	30	15
04	Technical/professional topics	9	17	13	13	14
08	Project operation: specific	8	12	11	5	10
07	Project operation: general	5	7	6	3	5
05	Project focus topics: external	7	5	5	6	5
02	Subjects learned in courses	2	5	3	8	4
24	Process/implementation (proj)	2	2	5	7	4
Percentage of all knowledge statements included within these categories		79%	70%	75%	77%	73%

Enabling Skills

Table 8.22 contains a listing of the five most frequently relied upon categories of skills in the 20 projects studied. By and large the category labels presented in the table are reasonably self-explanatory. The one exception is that of Finding Fits/Integrating. As used in the Oregon Studies, this category refers to the integration of ideas, perceiving the relevance of something when its relevance is not apparent, fitting people to tasks and people to people, etc.

TABLE 8.22

The Five Categories Used Most Frequently
To Classify the Skills Relied Upon
In Educational RDD&E Projects

Set UV Coding	Primary Categories of Enabling Skills	Project Focus				Total (20)
		Res (5)	Dev (7)	Diff (5)	Eval (3)	
14	Writing	12	35	32	11	90
02	Facilitating people interaction	7	26	28	13	74
18	Finding fits/integrating	8	30	18	8	64
19	Planning/conceptualizing	6	19	11	9	45
11	Disciplining self	5	17	7	9	38
Total number of skill statements coded within the categories		38	127	96	50	311
Total number of skill statements		89	323	281	155	848
Percentage of skill statements coded with the five categories		43%	39%	34%	32%	37%

Three features of the data presented in Table 8.22 are noteworthy: (a) the nature of the skills listed; (b) the distribution of their use across project foci; and (c) the percentage of the total number of skills identified that were classified within the five categories. From the point of view of the content of most RDD&E training programs, the skills listed are a surprise. Writing, Facilitating People Interaction, finding fits between people, ideas and things, Planning-Conceptualizing, and disciplining oneself to work, are not skills that are commonly trained for. From the point of view of persons who have been in the field for any period of time, however, and especially those who have directed or managed projects of their own, the skills listed are a confirmation of what had long been suspected. The "bread and butter" skills of day-to-day project operation and survival in a context of competitive project funding are more basic than has heretofore been recognized.

Interestingly, the five skills seem to be relied upon equally heavily within all project foci. In only one instance, that of Disciplining Self, did the dominant pattern of use vary by project focus. Compared to other work requirement data the most frequently relied upon skills in educational RDD&E appear to be reasonably generic to the domain as a whole.

Compared to the knowledge data just reviewed, the five most frequently used categories of skills contain a relatively small percentage of skill statements identified in the 20 projects studied. Whereas the five most frequently used categories of knowledge accounted for 61 per cent of all knowledge statements identified, the five skill categories listed in Table 8.22 account for only 37 per cent of the skill statements. This suggests that the reader should peruse Appendix 8 carefully to determine the full range and distribution of skills identified in the 20 projects. Another 45 categories of skills exist; they contain 63 per cent of the skill statements collected; and they are distributed much more unevenly across project foci than is the case for the five categories presented in Table 8.22.

Table 8.23 represents an extension of Table 8.22 in that it presents the five most frequently relied upon categories of skills within each project focus. Three new categories of skills make their appearance in the table: Analytical Data Handling, Persuading/Justifying, and Analytical Problem Solving. The category Analytical Data Handling replaces Disciplining of Self as a much used skill in research projects; the categories Persuading/Justifying and Analytical Data Handling replace Planning/Conceptualizing and Disciplining Self as much used skills in diffusion projects; and the category Analytical Problem Solving replaces Planning/Conceptualizing in evaluation projects. By and large, these data are consistent with task data reported earlier. For example, the proportionately high frequency of data collection and reduction tasks in research projects and the frequent need to explain or justify diffusion projects to others are consistent with the tasks common to those foci. In all project foci, however, the skills of Writing and Facilitating People Interactions are two of the three most heavily relied upon skills in carrying out project operations.

The data presented in Table 8.24 reconfirm the prominance of these two skills in the operation of projects throughout the domain, and begin to point to the variability within the skill data as low frequency categories are considered. Again, the reader is urged to study Appendix 8 carefully for a sense of the range and variability of skills employed in the conduct of educational RDD&E.

TABLE 8.23

The Five Most Frequently Used Categories of Enabling Skills Within Project Foci, Their Frequency of Use, and the Percentage of Skill Statements Coded Within Them

Set UV Coding	Primary Categories of Enabling Skills	Freq of Use	% of Skill Statements Coded
	Research Focus (5 Projects)		
14	Writing	12	13
18	Finding fits/integrating	8	9
02	Facilitating people interactions	7	8
10	Analytical data handling	7	8
19	Planning/conceptualizing	6	7
	Totals (5 Categories)	40	45%
	Development Focus (7 Projects)		
14	Writing	35	11
18	Finding fits/integrating	30	9
02	Facilitating people interactions	26	8
19	Planning/conceptualizing	19	6
11	Disciplining self	17	5
	Totals (5 Categories)	127	39%
	Diffusion Focus (5 Projects)		
14	Writing	32	11
02	Facilitating people interactions	28	10
23	Persuading/justifying	19	7
18	Finding fits/integrating	18	6
10	Analytical data handling	13	5
	Totals (5 Categories)	110	39%
	Evaluation Focus (3 Projects)		
02	Facilitating people interactions	13	8
14	Writing	11	7
09	Analytical problem solving	10	7
11	Disciplining self	9	6
18	Finding fits/integrating	8	5
	Totals (5 Categories)	51	33%

TABLE 8.24

The Eight Categories Used Most Frequently to Classify the Skills Relied Upon in Educational RDD&E, and the Percentage of Skill Statements Coded Within Them by Project Focus

Set UV Coding	Primary Categories of Enabling Skills	Project Focus				Total (20)
		Res. (5)	Dev. (7)	Diff. (5)	Eval. (3)	
14	Writing	13%	11%	11%	7%	11%
02	Facilitating people interaction	8	8	10	8	9
18	Finding fits/integrating	9	9	6	5	8
19	Planning conceptualizing	7	6	4	6	5
11	Disciplining self	6	5	2	6	4
10	Analytical data handling	8	2	5	5	4
23	Persuading/justifying	4	2	7	2	4
9	Analytical problem solving	1	3	1	7	3
Percentage of all skill statements included within these categories		56%	46%	46%	46%	48%

Enabling Sensitivities

It will be recalled that a sensitivity was defined in the Oregon Studies as "an increment of awareness about an environment or factors operating in or on an environment, as well as attitudes and personality characteristics." The rationale underlying the collection of data about sensitivities was the simple notion that to be successful projects must have staff that are sensitive to a wide range of human and environmental factors, and that can and will act upon those sensitivities as needed. The five categories of sensitivities or awarenesses most frequently cited as being needed in the 20 projects studied are displayed in Table 8.25. The five categories most frequently cited by project foci are displayed in Table 8.26.

In many ways the sensitivity data reflect the same pattern, and demand the same observations, as the skill data just reported. The nature of the sensitivities cited, their distribution across project foci, and the relatively small percentage of the total set of sensitivity statements accounted for by the five categories are all noteworthy. It is extremely interesting, for example, that the five most frequently cited sensitivity categories pertain to people related awareness. It is also interesting that the first three of the five categories pertain primarily to staff related sensitivities, the second two to consumer related sensitivities, and that none of the categories pertained directly to attitudes or personality characteristics. The implications for the design of personnel development programs and the conduct of projects are clear.

TABLE 8.25

The Five Categories Used Most Frequently to Classify The Sensitivities Needed in Educational RDD&E

Set UV Coding	Primary Categories of Enabling Sensitivities	Project Focus				Total (20)
		Res (5)	Dev (7)	Diff (5)	Eval (3)	
02	Capabilities and limitations	10	39	16	11	76
16	Existing value systems	5	29	20	10	64
03	Needs of self and others	2	21	23	4	50
30	Response sets of tgt audiences	3	8	20	7	38
22	Responses of target audiences	7	12	9	3	31
Total number of sensitivity statements coded within the categories		27	109	88	35	259
Total number of sensitivity statements		81	264	217	123	685
Percentage of sensitivity statements coded with the five categories		33%	41%	41%	28%	38%

The data reported in Table 8.25 assume a slightly different pattern in their distribution across RDD&E than did the skill data. There is, proportionately, a heavier loading of the five categories listed in development and diffusion projects than in research and evaluation projects, and the variability in use patterns between and within development and diffusion projects is considerably greater for sensitivities than skills. The percentage of sensitivity statements that remain unaccounted for by the five categories, however, is approximately the same, (62% as opposed to 61%), and the number of categories of sensitivities into which the remaining statements are classified are as numerous (53 as opposed to 45). As a consequence, the reader also needs to study Appendix 7 to gain a sense of the full range and distribution of sensitivities identified within the 20 projects studied.

The data presented in Table 8.26 introduces six additional sensitivities that are much needed or relied upon in the conduct of educational RDD&E projects. Within the context of research, a sensitivity to the values of oneself and of others and an awareness of various structural characteristics of the environment and/or field of operations are more often relied upon than the commonly shared sensitivity to the needs of self and others and sensitivity to the response sets of target audiences. Within the context of development, a sensitivity to language barriers emerges as more often needed than an awareness of the response sets of targeted audiences. Within the context of diffusion a sensitivity to the interactions between oneself and others is relied upon more often than a sensitivity to the responses

TABLE 8.26

The Five Most Frequently Used Categories of Enabling Sensitivities, Their Frequency of Use, and the Percentage of Sensitivity Statements Coded Within Them

Set UV	Primary Categories of Enabling Sensitivities	Freq of Use	% of Sensitivity Statements Coded
	Research Focus (5 Projects)		
02	Capabilities and limitations	10	13
22	Responses of target audiences	7	9
01	Values of self and others	6	7
10	Awareness of structure	6	7
16	Existing value systems	5	6
	Totals (5 Categories)	34	42%
	Development Focus (7 Projects)		
02	Capabilities and limitations	39	15
16	Existing value systems	29	11
03	Needs of self and others	21	8
13	Language barriers	14	5
22	Responses of target audiences	12	5
	Totals (5 Categories)	115	44%
	Diffusion Focus (5 Projects)		
03	Needs of self and others	23	11
16	Existing value systems	20	9
30	Response sets of target audiences	20	9
02	Capabilities and limitations	16	7
04	Interactions of self and others	15	7
	Totals (5 Categories)	94	43%
	Evaluation Focus (3 Projects)		
02	Capabilities and limitations	11	9
16	Existing value systems	10	8
47	Willingness to work as needed	9	7
30	Response sets of target audiences	7	6
21	Limitations of analyses/data	6	5
	Totals (5 Categories)	43	35%

of target audiences. Within the context of evaluation a sensitivity to the limitations of data analyses and a willingness to work as needed (a personality trait?) emerge as more often needed than sensitivity to the needs of self and others and to responses of target audiences. As would be expected from Table 8.25, sensitivity to the capabilities and limitations of self and others, and sensitivity to existing value systems, maintained their frequent use positions within all project foci. These were the only categories of the five categories listed in Table 8.25 to do so. As such, the data reported in Table 8.26 reinforce the need to become familiar with Appendix 9 for a full sense of the range and distribution of the data collected in the Oregon Studies on project related sensitivities.

Table 8.27 contains the last display of work requirement data associated with the aggregate of project outputs. It contains a summary of the categories presented in Tables 8.25 and 8.26, and presents the percentage of sensitivity statements identified that have been coded within them.

TABLE 8.27

The Eleven Categories Used Most Frequently to Classify
the Sensitivities Needed in Educational RDD&E,
and the Percentage of Sensitivity Statements
Coded Within Them by Project Focus

Set UV Coding	Primary Categories of Enabling Sensitivities	Project Focus				Total (20)
		Res. (5)	Dev. (7)	Diff. (7)	Eval. (3)	
02	Capabilities and limitations	13%	15%	7%	9%	11%
16	Existing value systems	6	11	9	8	9
03	Needs of self and others	2	8	11	3	7
30	Response sets of tgt audiences	4	3	9	6	6
22	Responses of target audiences	9	5	4	2	5
01	Values of self and others	7	4	5	1	4
04	Interactions of self & others	4	2	7	1	4
13	Language barriers	2	5	3	2	4
21	Limitations of analyses/data	2	2	2	5	3
10	Awareness of structure	7	2	2	0	2
47	Willingness to work as needed	0	1	0	7	2
Percentage of all skill statements included within these categories		56%	58%	59%	44%	57%

Work Requirements Data In Perspective

The linkage of the data presented in this chapter to data presented in Chapter 7 has already been discussed. When viewed separately from specific output relationships work requirements data have much the same information load as task data reported in relation to jobs, that is the data describe the range and nature of work in educational RDD&E. The utility of such data rests in the degree to which it provides the trainer substantive information on which to design and conduct training in a broad sense. Thus the chapter has introduced the reader to the range and nature of the data when collected in relation to the outputs of educational RDD&E and displayed in relation to the focus of each project within which they were found.

Project Organized Data in Perspective

The three preceding chapters have presented the data collected within the Oregon Studies from the point of view of its range and its distribution by RDD&E. Chapter 6 reported data on the characteristics of project personnel; Chapter 7 reported data on the nature of project outputs; and Chapter 8 reported data on the nature of work requirements within projects. In combination these three chapters were designed to meet the obligations assumed by the Oregon Studies to "map the parameters" of the domain of educational RDD&E, and to analyze the data used in that mapping for similarities and differences across project foci within the domain.

As the data were presented in Chapters 6, 7, and 8 the primary sampling unit, and thus the primary unit of analysis, was the project. So organized, the data have both strengths and weaknesses. Since the 20 projects studied were selected with a view to "mapping" the external parameters of the domain of educational RDD&E, they provide a reasonably good sampling base for portraying the range of personnel, outputs, and work requirements found within the domain. Unfortunately, however, a sample of projects selected to establish the external parameters of a domain provides a relatively weak base for exploring similarities and differences within that domain. Accordingly, the data reported on similarities and differences across project foci can be taken only as suggestive or supportive of hypothesis generation. Under no conditions can they be construed as representing strong central tendency data. As a consequence the person who wishes to make use of the data reported thus far has in fact two sets of data to deal with, that reporting the range of things observed within the domain, and that reporting the central tendencies of things as they are distributed by RDD&E. While considerable confidence can be placed in the first, care must be taken against over-interpreting the second. In combination, however, the two sets of data should be of considerable value to persons responsible for operation of personnel development programs, for persons wishing to pursue further research on the nature of educational RDD&E, etc., for they represent the only data base of their kind that is available.

Chapter 9

OUTPUT DIMENSIONS AND INTERACTIONS

The three previous chapters have organized the presentation of data around the projects. Data in those chapters was presented in an effort to map the domain of educational RDD&E using projects in the focal areas of research, development, diffusion and evaluation as organizers. The present chapter is the first of three chapters to analyze the data collected in the Oregon Studies where outputs instead of projects are used as the primary unit of analysis. In these chapters the concern with project sample that dominated the presentation of the data in the previous chapters is no longer a primary issue. In its place is the issue of the adequacy of the output sample.[1] The rationale for using outputs as a primary unit of analysis when looking at work requirements, for example, rests upon the simple notion that what needs to be produced in large part determines what needs to be done to produce it. It also rests upon the observation that outputs represent a much more stable unit of analysis for work requirements within RDD&E than organizers such as jobs or job roles. Outputs have a stability about them, both across and within projects, that allows work requirements to be linked to them meaningfully and with a view to generalizability. All the projects visited in the Oregon Studies and, assumedly, all projects in the domain of educational RDD&E concern themselves with the production of outputs of one kind or another. Because these outputs can be identified and subsequently analyzed regardless of the projects in which they are found and regardless of the focus or purpose of the project they represent a stable, consistent, and common element around which data can be gathered, analyzed and presented. The three chapters that report data using outputs as the unit of analysis deal, respectively, with the dimensions of outputs, the work requirements associated with outputs, and a conceptual framework for viewing the relationship between outputs and the work required for their production.

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[1] Obviously, since outputs are linked to projects, the matter of project and output sample are not independent. The point is, however, that when outputs are taken as the unit of analysis projects need to be treated only as the vehicles by which outputs are identified. For an analysis of the adequacy of the output sample within the Oregon Studies, see Chapter 8.

An Orientation to the Output Data

The focus of the present chapter is the dimensionality of outputs. It will be recalled from Chapter 7 that four dimensional properties of outputs were identified during the course of the Oregon Studies: (a) the dimension of structure (products, events, conditions); (b) the dimension of function (policy setting, management, production); (c) the dimension of character (knowledge, technology, implementation, information); and (d) the dimension of level (focal, component, facilitative). It will also be recalled that only the dimension of structure was dealt with in Chapter 7. The purpose of the present chapter is to present the data available on the remaining dimensions of outputs.

Two observations need to be made by way of introduction to the data presented in the chapter. The first has to do with multiple classification. While the concept of multiple classification is not new to science or scientists, there is always an element of surprise, and usually relief, to discover that a particular phenomenon can be viewed from more than one perspective, and that the validity of the observation made tends to depend on the perspective taken. Such was the case when it was "discovered" that outputs of work effort had properties other than structure, that is, properties other than being products or events or conditions. To find that outputs served particular functions within projects, that they had certain characteristics or substantive properties that identified them with research or development or diffusion or evaluation activities, that they were always nested within a hierarchically and interdependently ordered network of outputs, and that much of their meaning within the context of a particular project rested upon their placement within that network, provided a revealing new set of perspectives. The four dimensions of outputs that have been labeled structure, function, character, and level accommodate all of the properties of outputs identified during the course of the Oregon Studies.[2]

The second observation by way of orientation to the chapter is that the classifications given an output in terms of its function, character, and level are situation specific. Operationally this means, for purposes of classification, that a particular output plays a particular function within a particular project, and assumes a particular character and holds a particular position or level within that project. Operationally, it also means that an identical output within another project could assume a totally different function, character, and position. While the structure of outputs are stable from the point of view of classification, that is, a product or event or condition is always a product or event or condition, irrespective of its project context, the output dimensions of function, character, and level vary according to the project context within which they reside. The situation specific nature of outputs can be seen best within the context of the output maps that have been prepared for each project studied. These are reported within the case profiles that appear as Volume IV of the series of volumes reporting the Oregon Studies.[3]

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[2] It is not suggested, however, that the properties of dimensions identified thus far are exhaustive of the dimensional properties of outputs. Nor is it suggested that the properties identified thus far are even the most critical properties of outputs from the point of view of training or project operation. The fact that they have been identified, however, that they can be judged with a high degree of reliability, and that they seem to exhaust the properties of outputs that had to be understood in order to collect the kind of data sought within the Oregon Studies, establishes them as dimensions that need to be attended to with some seriousness.

Three analyses of output dimension data are presented in the chapter. The first deals with the properties or characteristics of each dimension individually. The purpose of this type of analysis is to convey the meaning of the various output dimensions identified, the sub-classifications given each dimension, and the distribution of the 962 outputs identified in relation to each dimension and its sub-classifications. The second and third kinds of analyses deal with the interactions between dimensions. The second explores the relationship between the various two-way combinations of the three dimensions identified, e.g., the function played by outputs having differing characteristics, and the third explores three-way combinations, e.g., the function played by outputs having differing characteristics within various project foci. Within all three kinds of analyses outputs are differentiated according to their structure, i.e., products, events, conditions.

Definitions, Illustrations and Single Dimension Analyses

Output Function

The function of an output refers to the purpose it serves within the context of a particular project. Three broad functions were identified within the Oregon Studies as a basis for data collection and analysis: the policy setting function, the management function, and the production function. The following definitions were adopted for these functions:

Policy setting function - a classification given an output that establishes standards or guidelines for a project.

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[3] The recognition of the situation specific nature of outputs has major implications for persons wishing to use outputs as a basis for the organization of personnel development programs, as well as for persons interested in the further investigation of outputs empirically. It also has implications for understanding the data to be reported, for the power of the context in shaping the classification of some outputs was so great that understanding those classifications outside a project context is sometimes difficult. The reader is reminded that the case profiles provide that context when it is needed.

Management function - a classification given an output that orchestrates the resources (time, personnel, materials, space, information) available to a project for the realization of the outcomes expected from it; also a report of that orchestration.

Production function - a classification given an output that is a part of the total fabrication effort of a project.

Thus, any output of work effort within a project that established standards or guidelines relative to the project was classified as serving a policy setting function. In like manner, any output of work effort that orchestrated the resources available to a project toward the realization of desired outcomes was classified as serving a management function, and any output that contributed in direct fashion to the overall task of actually fabricating or assembling the outputs produced within a project was classified as serving a production function.

The data presented in Table 9.1 illustrate, at the cluster category level, the nature of the functions served by the ten most frequently appearing clusters of products, the five most frequently appearing clusters of events, and the five most frequently appearing clusters of conditions. Taking the first entry in the table as an example, the data in the table are to be interpreted as follows: of the 122 outputs identified as being as instance of a report or contract, 79 served a management function, 43 served a production function, and none served a policy setting function. A complete listing of the cluster categories of products, events, and conditions by functions served appears as Appendix 10. A summary of the data appearing in Appendix 10 is presented in Table 9.2.

Three features of the data presented in Table 9.2 are noteworthy: (a) the large number of outputs that served the management function; (b) the large proportion of events and conditions that served the management function; and (c) the small number of outputs that served the policy setting function. Needless to say, the sheer number of outputs identified as serving the management function came as a surprise. This is not to imply that the management function was unknown or unexpected, especially in light of the number of "managers," project directors, etc. that were identified and interviewed within the projects studied (see Chapter 6). The relative amount of attention directed to the management function, however, was unexpected. It is possible, of course, due to the size of the projects studied or the imbalance in the sample in favor of development and diffusion projects, that the data reported could be inflated with respect to management. But even if it were, and corrections were made for it, the number of project outputs serving a management function would still be impressive. On the basis of the data that are now available it is likely that too little attention has been paid the management function in the past, both within the field and in personnel development programs.

TABLE 9.1

The Functions Served by Selected Categories of Outputs

Set DE Coding	Cluster Categories	Output Dimension: Function			Output Totals
		Policy Setting	Mgt.	Prod.	
	STRUCTURE: PRODUCTS				
01	Reports/Contracts	0	79	43	122
04	Work Specifications/Procedures	3	38	37	78
27	Data (including printouts)	0	38	37	75
02	Data Instruments/Techniques	0	27	47	74
08	Plans/Designs/Theories/Models	7	48	18	73
05	Work Management Systems	0	57	5	62
03	Guides/Manuals	3	24	29	56
10	Publications	1	15	36	52
07	Resource Lists	0	17	27	44
14	Instructnl Units/Use w/Staff	0	4	35	39
	STRUCTURE: EVENTS				
32	Recruiting/Placing Staff	0	21	0	21
33	Collecting/Analyzing Data	0	9	7	16
52	Adapting Materials	0	0	12	12
43	Establishing Opns Parameters	7	4	0	11
17	Workshops/Institutes	0	4	6	10
	STRUCTURE: CONDITIONS				
21	Working Environment/Atmosphere	0	19	0	19
20	Cooperative Relationships	1	12	1	14
34	Coordinated Efforts	1	8	1	10
22	Quality Assurance	1	6	0	7
23	Accountability	0	6	0	6

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TABLE 9.2

The Functions Served by Products, Events and Conditions

Structure of Outputs	Function of Outputs			Output Totals
	Policy-Setting	Management	Products	
Product	14	361	384	759
Event	9	89	32	130
Condition	3	64	6	73
TOTALS	26	514	422	962

By and large, the proportion of events and conditions serving the management function was not surprising. Events and conditions typically serve a facilitative role, and management is typically thought of as facilitative. The small number of products, events and conditions serving the policy setting function, however, was surprising. Given the definition of the policy function as "establishing standards or guidelines for a project," it seems obvious that policy setting must occur, but there was little evidence of its being formalized within the 20 projects studied. Apparently, except in the case of very large or complex projects, policy setting occurs informally or "unconsciously" through the prerogatives of a project director or other influential people.

Before leaving the function data the reader is encouraged to review Table 9.1 for a sense of the way in which the various categories of outputs are distributed by function. The variability by category is considerable, and this must be remembered in interpreting or acting upon the data presented in Table 9.2. Appendix 10 contains a complete listing of the output cluster categories and the functions served by the outputs contained therein.

Output Character

The character of an output refers to what it substantively represents within the context of a particular project. For purposes of the Studies, four categories describing this substance were employed. These included an output as an instance of (a) knowledge, (b) a technology, (c) implementation, or (d) as an instance of information. For theoretical reasons (see Chapter 4 in Volume III of the series of volumes reporting the Studies) the definitions given these characteristics are closely related to research, development, diffusion, and evaluation:

Knowledge - a classification given an output of research, i.e., an instance of established fact, principle, law, etc., that is generalizable and that can stand the test of empirical verification.

Technology - a classification given an output of development, i.e., an instance of a plan, procedure or product that, when applied, can bring about a desired end with a known degree of reliability.

Implementation - a classification given an output of diffusion, i.e., an instance of the adoption and utilization of knowledge, information, and/or technology.

Information - a classification given an output of evaluation, i.e., an instance of reliable information about a given phenomenon within a context over which the user expects to exercise influence or about which he expects to make decisions.

Thus defined, any output that both met the substantive criteria of knowledge, technology, etc., and was viewed or treated as such within the context of the project, was classified accordingly.

The data presented in Table 9.3 illustrates the character ascribed to the ten most frequently appearing cluster categories of products, the five most frequently appearing cluster categories of events, and the five most frequently appearing cluster categories of conditions. The table is to be read in the same manner as was Table 9.1. A complete listing of the cluster categories of products, events, and conditions by the position held within the projects studied appear in Appendix 11. A summary of the data appearing in Appendix 11 is presented in Table 9.4.

From Table 9.4 it can be seen that more than half of all the outputs identified were categorized as technology. More than 20 per cent of the outputs identified assumed the character of information and 14 per cent assumed the character of implementation. Only 4 per cent of the 962 outputs identified assumed the character of knowledge. It is clear from these data that while any single project is likely to employ a wide range of outputs typically associated with research (knowledge), development (technology), diffusion (implementation), or evaluation (information), by far the most used category into which outputs can be placed is technology. These data are in keeping with the hypothesis developed in the Schalock and Sell paper in Volume III of the Oregon Studies that holds that research, development, diffusion, and evaluation represent "nested sets" of problem solving activities.

TABLE 9.3

The Occurrence of Character Classifications Given Selected Categories of Outputs

Set DE Coding		Output Dimension: Character				Output Totals
	Cluster Categories	Know	Tech	Imp	Info	
	STRUCTURE: PRODUCTS					
01	Reports/Contracts	10	18	16	78	122
04	Work Specifications/Procedures	0	74	0	4	78
27	Data (including printouts)	2	3	1	69	75
02	Data Instruments/Techniques	0	74	0	0	74
08	Plans/Designs/Theories/Models	3	69	1	0	73
05	Work Management Systems	2	47	9	4	62
03	Guides/Manuals	0	55	0	1	56
10	Publications	0	6	36	10	52
07	Resource Lists	0	33	1	10	44
14	Instructnl Units/Use w/Staff	0	39	0	0	39
	STRUCTURE: EVENTS					
32	Recruiting/Placing Staff	2	8	8	3	21
33	Collecting/Analyzing Data	1	8	0	7	16
52	Adapting Materials	0	12	0	0	12
43	Establishing Opns Parameters	0	4	2	5	11
17	Workshops/Institutes	0	8	2	0	10
	STRUCTURE: CONDITIONS					
21	Working Environment/Atmosphere	5	5	6	3	19
20	Cooperative Relationships	2	6	5	1	14
34	Coordinated Efforts	1	6	2	1	10
22	Quality Assurance	1	5	1	0	7
23	Accountability	2	2	1	1	6

More is said about the interaction of project focus and character later in the chapter.[4]

TABLE 9.4

The Character of Outputs by Structure

Structure of Outputs	Character of Output				Output Totals
	Knowledge	Technology	Implementation	Information	
Product	17	473	85	184	759
Event	9	70	31	20	130
Condition	14	33	20	6	73
TOTALS	40	576	136	210	962

Output Level

The level of an output refers to the position it holds with respect to all other outputs within the context of a particular project. Three categories were developed within the Oregon Studies to describe the various positions held by outputs: a focal position, a component position, and a facilitating position. The following definitions were adopted for these descriptors:

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[4] It is recognized that the concept of output character, and the language used in relation to it, is difficult to manage. To help in this regard the reader is encouraged to refer to the definitions provided on the previous page, the GLOSSARY that accompanies the volume, the Schalock-Sell paper in Volume III of the series of volumes reporting the Studies, and the table in each profile that identifies the character classification given specific outputs. The reader needs to be warned, however, that the context specific procedures followed in character classifications makes the logic of some character codes assigned to some outputs difficult to understand at face value. For a complete review of the definitions and the decision rules which describe the context specific nature of the classification, refer to the operational definitions and decision rules contained in Volume V of the Series. Evidence presented in Chapter 4 of this volume attests to the fact that coders were able to reliably apply the categories pertaining to output character in accordance with those decision rules.

Focal output - an outcome of work effort expected by contractual obligation to emerge from a project.

Component output - an outcome of work effort that constitutes an element of, or an approximation to, a focal output.

Facilitating output - an outcome of work effort that supports the generation of focal or component outputs, but is not in itself a part of such outputs.

The reader is referred to the output maps that appear in each of the case profiles to see how these category sets are used to organize the interdependencies of the outputs identified within a project. Directions for reading an output map are provided in the GUIDE to profile reading that accompanies the profiles in Volume IV of the series reporting the Oregon Studies.

The data presented in Table 9.5 illustrate the various positions held by the ten most frequently appearing cluster categories of products, the five most frequently appearing cluster categories of events, and the five most frequently appearing cluster categories of conditions. A complete listing of the positions held by the cluster categories of products, events, and conditions identified within the projects studied appears in Appendix 12. A summary of the data appearing in Appendix 12 is presented in Table 9.6.

It will be seen from the data presented in Table 9.6 that by far the greatest proportion of outputs served in a facilitative capacity. In fact, approximately three of every four outputs were identified as facilitating the production of other outputs. Put in another frame of reference, the data reported in Table 9.6 suggest that for every focal output undertaken an average of 4 facilitating outputs must be linked to it in some way.

While the majority of events and conditions assume a facilitating role, it is interesting to note that 7 events and 8 conditions also assume focal position. Surprisingly, no conditions were identified at the component level. No explanation can be given for this, but its occurrence does raise some interesting questions about the nature of conditions. Reference to the definition provided for conditions in Chapter 7 may clarify this phenomenon for the reader.

It is also of interest to note from the data reported in Table 9.6 that the average number of focal or contracted-for outputs identified for each project studied was 6.7 (134 focal products in 20 projects). While this figure has little meaning in and of itself, the wide variation in the size and duration of the projects studied does point up the fact that projects tend to have multiple contracted-for outputs. Some sense of the nature and variety of the outputs contracted for within the 20 projects studied can be gained from Table 9.5. As can be seen from the data reported in the table, the majority of focal

TABLE 9.5

The Occurrence of Level Classifications Given Selected Categories of Outputs

Set DE Coding	Cluster Categories	Output Dimension: Level			Output Totals
		Focal	Component	Facilitating	
	STRUCTURE: PRODUCTS				
01	Reports/Contracts	41	18	63	122
04	Work Specifications/Procedures	1	19	58	78
27	Data (including printouts)	6	17	52	7[illegible]
02	Data Instruments/Techniques	1	26	47	74
08	Plans/Designs/Theories/Models	7	9	57	73
05	Work Management Systems	5	5	52	62
03	Guides/Manuals	9	17	30	56
10	Publications	21	13	18	52
07	Resource Lists	7	9	57	73
14	Instructnl Units/Use w/Staff	1	28	10	39
	STRUCTURE: EVENTS				
32	Recruiting/Placing Staff	0	0	21	21
33	Collecting/Analyzing Data	0	0	16	16
52	Adapting Materials	0	0	12	12
43	Establishing Opns Parameters	3	0	3	11
17	Workshops/Institutes	0	4	6	10
	STRUCTURE: CONDITIONS				
21	Working Environment/Atmosphere	0	0	19	19
20	Cooperative Relationships	2	0	12	14
34	Coordinated Efforts	1	0	9	10
22	Quality Assurance	0	0	7	7
23	Accountability	0	0	6	6

outputs were products, and they tended to take the form of Reports/Contracts, and Publications. If the categories of Guides/Manuals, Resource Lists, Guides/Designs/Theories/Models, and Work Management Systems are added to these two first categories, however, 90 of the 105 instances of focal outputs identified assume the form of paper products! The full range of outputs contracted for by the 20 projects studied will be found in Appendix 12.

TABLE 9.6

The Occurrence of Level Classifications Given
Products, Events and Conditions

Structure of Outputs	Level of Outputs			Output Totals
	Focal	Component	Facilitating	
Product	119	212	428	759
Event	7	5	118	130
Condition	8	0	65	73
TOTALS	134	217	611	962

The data presented thus far in the chapter have shown how multiple classification systems can be brought to bear upon the analysis of outputs, and how the 962 outputs are distributed within those classification systems. The next set of analyses deal with the interactions that occur between these classification systems.

Two Dimensional Interactions

Thus far in the chapter the dimensional properties of outputs that are free to vary across settings, that is, function, character and level, have been treated separately. Since these represent multiple classifications of the same set of outputs, it is possible to examine the relationship between any two of them. It is possible, for example, to determine the character of the outputs that served a particular function, the functions served by outputs that held particular positions in the hierarchical organization of outputs, etc.

Four analyses are presented in the pages that follow. These involve the interactions between output function and character, output function and level, and output character and level. The relationship between output character and project focus is also presented to provide the reader with a sense of the way outputs categorized by character are "nested" within each of the focal areas of the domain of educational RDD&E. Since the data presented in each case are in highly summarized form, and are easily read, a minimum of discussion will accompany their presentation.

The Interaction of Output Function and Character

Table 9.7 displays the relationship between the functional properties of outputs and their character.

TABLE 9.7

The Interaction of Output Function and Character

Function of Outputs	Character of Outputs				Output Totals
	Knowledge	Technology	Implementation	Information	
Policy-Setting	0	19	2	5	26
Management	26	278	80	130	514
Production	13	279	54	76	422
TOTALS	39	576	136	211	962

The table can be read either horizontally or vertically. Reading horizontally the data show, for example, that in the 20 projects studied no outputs that were instances of knowledge occurred for purposes of policy setting, but that there were 19 instances of technology, two instances of implementation, and five of information that served a policy setting function. Reading vertically the data show, for example, that while no outputs meeting the criteria of knowledge served the purpose of policy setting, 26 that met such criteria served the purpose of management and 13 served the purpose of production. No particular explanation can be offered for the patterning of the data reflected in the table, and no effort will be made to speak to its significance. The distribution of outputs that assumed the form of a technology, however, and the heavy demand of the management function on outputs of all kinds, are noteworthy.

The Interaction of Output Function and Level

Table 9.8 displays the relationship between the functional properties of outputs and the position or level held in the hierarchical organization of outputs produced by a particular project. The table is to be read in the same way as Table 9.7. Again, while no explanation will be offered for the patterning of the data that is reflected in the table, and no comment will be made as to the significance of its pattern, the distribution of focal outputs across functions, and the distribution of the various level classifications within each function, are noteworthy. Especially striking in this regard is the finding that roughly 90 per cent of management related outputs were facilitating in nature, and that roughly 75 per cent of all facilitating outputs supported the management function. Clearly, the relationship between the management and production functions is complex, and probably more interwoven than has been suspected in the past.

TABLE 9.8

The Interaction of Output Function and Level

Function of Output	Level of Outputs			Output Totals
	Focal	Component	Facilitating	
Policy-Setting	2	1	23	26
Management	40	15	459	514
Production	92	201	129	422
TOTALS	134	217	611	962

The Interaction of Output Character and Level

Table 9.9 displays the last of the possible interactions between output dimensions, namely, the relationship between output character and output level.

TABLE 9.9

The Interaction of Output Character and Level

Level of Outputs	Character of Outputs				Output Totals
	Knowledge	Technology	Implementation	Information	
Focal	12	56	37	29	134
Component	3	159	23	32	217
Facilitating	25	361	76	149	611
TOTALS	40	576	136	210	962

The table is to be read as the two previous tables were. The interpretations to be given the data that appear in the table, and the use to be made of them, are left to the reader.

The Interaction of Output Character and Project Focus

One other data display that is of significance for theoretical reasons is that which shows the relationship between output character and project focus. It will be recalled that these two variables are closely related to one another conceptually in that the definitions of output character (knowledge, technology, implementation, information) parallel the definitions of research, development, diffusion, and evaluation. Put in reverse order, the outputs of research, development, diffusion, and evaluation are expected to be, by definitions adopted in the Oregon Studies, knowledge, technology, implementation, and information respectively. Given this parallelism, and the additional assumption that RDD&E represent an interdependent or "nested set" of problem solving activities that always appear in concert in the solution of a particular educational problem (see the Schalock-Sell paper in Volume III of the Studies), two hypotheses about the relationship between output character and project focus can be formulated: (a) there should be a loading of knowledge outputs in research projects, technology outputs in development projects, etc.; and (b) each project focus should show the use of outputs that have the characteristics that reflect all other project foci. Taken together the two hypotheses would hold that while research projects, for example, should show a preponderance of the outputs associated with them to be knowledge outputs (the result of the definitional strategy), they should also show outputs that take the form of technology, information, and implementation (as predicted by the nested set hypothesis). The data displayed in Table 9.10 represent a beginning test of these hypotheses.[5]

As will be seen from the data, both hypotheses are reasonably well supported. Knowledge outputs had by far their highest loading in research projects; outputs that assumed the form of a technology had their highest loading in development projects; and outputs that took the form of implementation had their highest loading in diffusion projects. Also, with one exception, all project foci had outputs of all characteristics associated with them. As such, these data are seen as generally supportive of the two hypotheses.

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[5] In order to interpret the data presented in Table 9.10 most meaningfully it needs to be understood that projects were classified in the sample as representing research, development, diffusion, or evaluation on the basis of the overriding intent or concern that characterized the project, not on the basis of a specific contracted-for output. For a detailed discussion of project selection and classification procedures, the reader is referred to Chapter III of the present volume for project selection procedures.

TABLE 9.10

The Interaction of Output Character and Project Focus

Project Focus	Character of Output				Total
	Knowledge	Technology	Implementation	Information	
Research	34	58	9	18	119
Development	2	249	15	49	315
Diffusion	4	213	101	80	398
Evaluation	0	56	11	63	130
TOTALS	40	576	136	210	962

Three aspects of the data reported in Table 9.10, however, do not fully support these hypotheses. The high loading of technology outputs in diffusion projects; the failure of information outputs to load highly in evaluation projects; and the infrequent appearance of knowledge outputs in development, diffusion, and evaluation projects tend to indicate that the hypotheses presented may not be adequate. These conditions do not deny the viability of the hypotheses, however, and they can probably be accounted for in a number of ways. For example, it is possible to make the case that, by the very nature of educational RDD&E as evidenced by data presented previously, all projects have to rely heavily upon outputs that assume the form of technology and information. If that is true, then the distributions observed for those particular outputs in Table 9.10 would be expected. A reverse case could be built for the observed distribution of knowledge outputs: the conditions required to produce such outputs are either so demanding, or the criteria established for admitting an output to the status of knowledge so rigorous, that project foci other than research can rarely afford the luxury of either producing or depending upon such outputs. Whatever the explanation may be, the data presented in the table offer a rich base for speculation and hypothesis generation.

Three Dimensional Interactions

The analyses just completed looked systematically at various two-way combinations of output dimensions. While interesting and suggestive, they lead quickly to the desire for further detail. The data on outputs in the Oregon Studies were collected and organized in such a way that more complex analyses of output dimensions are possible.

Because these are relatively costly analyses to produce, however, and because they require a large data base to avoid a surfeit of empty cells, only one example will be presented of the kind of three dimensional analyses possible with the data.

The data presented in Table 9.11 show the relationship between output structure (products, events, conditions), project focus (R,D,D,E), and the output dimensions of function, character, and level. Each structure is represented by the *cluster* categories most frequently cited for *analyzed* outputs. The rationale for using this particular data base for demonstration purposes was twofold: (*a*) the use of cluster categories, as opposed to primary categories, provides for as large a data base as possible; and (*b*) the use of analyzed outputs, as opposed to identified outputs, provides the reader an opportunity to see in greater detail the source of the work requirement data reported in Chapters 8, 10, and 11. Fewer empty cells would have appeared in Table 9.11, of course, had the analysis included all identified outputs.[6] The value to be gained by the strategy followed, however, seemed to outweigh the frustrations of the empty cells.

The table can be read as follows. Using as a reference product cluster category 01, Reports/Contracts, and looking only at research projects, three of the 26 reports/contracts analyzed assumed the status of focal or contracted-for outputs, none served as components of the contracted-for outputs, and three served in a facilitative capacity to the focal outputs. When analyzed in terms of the function served, five of six outputs served a management function and one served the purposes of production. When analyzed in terms of their character, two of the six outputs used were identified as being instances of knowledge, two as instances of information, and one each as instances of technology and implementation. Continuing within the same cluster category, and looking at development projects, one of the 26 reports/contracts analyzed assumed the status of a focal output, one the status of a component output, etc. The table can be read in the same way for any combination of output category, output dimension, and project focus. It is not possible to determine from the data presented in the table, which of the focal outputs served what function or assumed what character, but that information can be made available.

Because the data are relatively self-explanatory once the structure of the table is understood, more will not be said about them. The reader is encouraged to peruse the data presented in the table at some length, however, as some interesting patterns are reflected in it.

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[6] While it is conceivable that a cluster category could be classified in any of the categories within the various dimensions, in a practical sense some such classifications would occur only rarely even in a broad sample. For example, one would not readily find an output having to do with the working environment of a project classified as a focal output (at least within the framework of current project generation and funding).

TABLE 9.11

The Dimensional Classifications of a Selected Set of Outputs
Analyzed, and the Distribution of Those Classifications by Project Focus

Output Structure: **Products**		Project Focus	Output Dimension									
			Level			Function			Character			
Set DE Coding	Cluster Categories		Foc	Comp	Fac	Pol	Mgt	Prod	Know	Tech	Imp	Info
01	Reports/Contracts (frequency of use = 26)	Res	3	0	3	0	5	1	2	1	1	2
		Dev	1	1	4	0	6	0	0	2	1	3
		Diff	5	0	4	0	5	4	0	0	4	5
		Eval	3	2	0	0	0	5	0	0	0	5
08	**Plans/Designs/Theories/Models** (frequency of use = 26)	Res	2	0	2	0	2	2	1	3	0	0
		Dev	1	3	13	2	10	5	0	17	0	0
		Diff	0	0	2	0	2	0	0	2	0	0
		Eval	0	0	3	1	2	0	0	3	0	0
04	Work Specifications/Procedures (frequency of use = 21)	Res	0	0	2	0	2	0	0	2	0	0
		Dev	0	6	7	0	5	8	0	13	0	0
		Diff	0	0	5	0	1	4	0	3	0	2
		Eval	0	0	1	0	1	0	0	1	0	0
02	Data Instruments/Techniques (frequency of use = 20)	Res	0	2	3	0	2	4	0	6	0	0
		Dev	0	4	3	0	3	4	0	7	0	0
		Diff	0	0	2	0	0	2	0	2	0	0
		Eval	0	1	4	0	1	4	0	5	0	0
32	**Recruiting/Placing Staff** (frequency of use = 14)	Res	0	0	2	0	2	0	2	0	0	0
		Dev	0	0	3	0	3	0	0	3	0	0
		Diff	0	0	8	0	8	0	0	2	6	0
		Eval	0	0	1	0	1	0	0	1	0	0
27	Data (including printouts) (frequency of use = 12)	Res	0	1	1	0	0	2	0	0	0	2
		Dev	0	1	7	0	7	1	0	1	0	7
		Diff	1	0	0	0	1	0	1	0	0	0
		Eval	0	1	1	0	0	2	0	0	0	2

TABLE 9.11
(continued)

Output Structure: Events		Project Focus	Output Dimension									
			Level			Function			Character			
Set DE Coding	Cluster Category		Foc	Comp	Fac	Pol	Mgt	Prod	Know	Tech	Imp	Info
33	Collecting/Analyzing Data (frequency of use = 4)	Res	0	0	1	0	0	1	0	1	0	0
		Dev	0	0	0	0	0	0	0	0	0	0
		Diff	0	0	1	0	1	0	0	0	0	1
		Eval	0	0	2	0	1	1	0	0	0	2
Output Structure: Conditions												
21	Working Environment/Atmosphere (frequency of use = 15)	Res	0	0	1	0	1	0	1	0	0	0
		Dev	0	0	2	0	2	0	0	2	0	0
		Diff	0	0	10	0	10	0	2	2	6	0
		Eval	0	0	2	0	2	0	0	0	0	2
20	Cooperative Relationships (frequency of use = 12)	Res	0	0	1	0	1	0	1	0	0	0
		Dev	0	0	5	0	5	0	0	5	0	0
		Diff	2	0	4	11	4	1	0	1	5	0
		Eval	0	0	0	0	0	0	0	0	0	0

Output Dimension Data in Perspective

Chapters 6, 7 and 8 have briefly described the people within projects, identified the outputs produced, and presented the output work requirements found in projects. This Chapter has more fully described the nature of the outputs produced by projects. To this point, each set of data has been presented independently. The chapters which follow link these data sets together and begin to describe the manner in which the Oregon Studies data may be "brought to life" for training purposes.

Chapter 10

OUTPUT-WORK REQUIREMENT INTERACTION

At one level of analysis, the data to be reported in the present chapter has been reported previously. In Chapters 7 and 9, respectively, the outputs identified in the 20 projects studied, and the interactions between the dimensional properties of those outputs, were described. In Chapter 8 the work requirements associated with the production of outputs were described, though independently of the outputs to which those data were linked. In the present chapter these two data sets are brought together, and work requirement data are reported in relation to the outputs that give those data full meaning.[1]

The rationale underlying the chapter is the same as that which led to the use of outputs as the organizing unit for work requirement data within the Oregon Studies. Outputs represent a tangible form of work effort; they provide a logical and defensible base for judging the consequences of work effort, i.e., the quantity and quality of that which has been produced as a consequence of work; and they tend to be stable throughout the life of a project. As a consequence, work requirement data that is linked to the production of outputs has some hope of becoming generalizable. That is not the case when it is linked to less stable entities such as job roles or positions.

Given such a point of view, outputs become not only a good vehicle for collecting work requirement data, but a useful vehicle for organizing and presenting it as well. If outputs do in fact crosscut project foci, and if the work required to produce a particular output to a particular standard is reasonably similar across project foci, then persons interested in the utilization of work requirement data should find its organization around outputs extremely useful. This should be the case especially for the designers of personnel development programs and the directors of projects.

The purpose of the present chapter is to link, in summary form, the work requirement data to specific classes of outputs. Operationally, this involves summarizing all the standards, tasks, and enablers identified in relation to the production of a particular class of output and presenting them in conjunction with that class of output. The strategy can be illustrated as follows. In the course of the Oregon Studies, 26 outputs that fell within output Cluster Category 01, Reports/Contracts, were analyzed for their associated work requirements. Each of these 26 outputs had standard, task, and enabler data elicited for it. Because the 26 outputs shared the property of being a report or contract, two assumptions can be made: (a) the standards, tasks, and enablers data accumulated for the 26 reports and contracts should share a great deal in common, at least if the 01 category was not too broad in its definition; and (b) in combination, the work requirement data identified for the 26 outputs should be fairly exhaustive and representative of the production of reports and contracts within educational RDD&E generally. Work requirement data organized in such a manner should be extremely helpful for persons concerned with either the production of reports and contracts or the preparation of others to produce them.

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[1] The distinction has been made in the Oregon Studies between work requirement data and work activity data. Work requirement data relate to the production of project outputs, and work activity data relate to job role performance. The work activity data are reported in Chapter 12.

One consideration that must be kept in mind in organizing work requirement data around outputs is the fact that the generalizability of such data, and to some extent its utility, depends upon the range and number of outputs analyzed within a particular category of output. Put in other terms, the utility or generalizability of output-work requirement data depends upon the adequacy of the sample of outputs on which it is based. Given that the focus of the Oregon Studies was on the identification of external parameters of projects and outputs rather than their central tendencies, the number of output categories identified that contain an extensive sample of outputs within them are few. Only eight cluster categories of products, for example, two cluster categories of events, and two cluster categories of conditions, have a frequency of ten or more outputs that have been coded and analyzed within them. As a consequence, from the point of view of its generalizability, the output-work requirement data for other cluster categories must be interpreted with reservation.[2]

For purposes of the present chapter, work requirement data have been summarized only for the five most frequently appearing cluster categories of products, the two most frequently appearing cluster categories of events, and the two most frequently appearing cluster categories of conditions. Because of the extensiveness of these summaries they are presented in appendix form. Accordingly, Appendix 13, displays all of the standards held for the outputs analyzed within each of the 9 cluster categories for which work requirement summaries have been prepared, Appendix 14 displays all of the tasks associated with the production of those same outputs, and Appendix 15 displays all of the enabling knowledges, skills, and sensitivities drawn upon in their production. Output cluster categories, because of the larger frequencies involved, were used in preparing these summary analyses. It is possible, of course, to prepare similar analyses for primary categories of outputs, or for output cluster categories that have a smaller number of outputs coded within them.

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[2] While confidence in the generalizability of output-work requirement data increases as the number of outputs on which it is based increases, it would seem that a good deal of useful information could be gained about work requirements within the domain of educational RDD&E from an analysis of categories of outputs having relatively few instances of outputs coded within them. The lower range in this regard is not clear, but utility could be found in an analysis of the work requirements associated with five or more outputs within a class of output, and it may extend to as few as three. If the latter criterion were adopted, useful output-work requirement summaries could be prepared for 28 of the 46 cluster categories of outputs analyzed within the Oregon Studies. If the criterion of five outputs per category of output were adopted, useful output-work requirement summaries could be prepared for 19 cluster categories.

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Table 10.1 demonstrates the linkage that will be found in Appendices 13, 14, and 15 between class of output and work requirement data. The data in Table 10.1 pertain only to standards, and only to one cluster category of outputs, but it is illustrative of the standards data presented for other cluster output categories, and illustrative of the nature of the data to be found for tasks and enablers as well.

The table is to be read as follows. Twenty-six outputs that met the definition of output Cluster Category 01, Reports/Contracts, were analyzed for their associated standards. Eighty-three output standards and 16 process standards were identified for these 26 reports and contracts. Of the 83 output standards identified, ten pertained to goal attainment, nine to completeness of content, etc. Of the 16 process standards identified four pertained to deadlines being met, two to performance being respected, and so on. By reading Table 10.1 in full it is possible to see both the nature of the standards held with respect to reports and contracts and the frequency with which various of those standards tend to be used. By reading Appendices 13, 14, and 15 in like manner, summary information on standards, tasks, and enablers can be gained for output cluster categories Reports/Contracts, Plans/Designs/Theories/Models, Work Specifications/Procedures, Data, Work Management Systems, Recruiting/Placing Staff, Establishing Operational Parameters, Establishing a Work Environment/Atmosphere, and Establishing Cooperative Relationships.

By referring to Appendices 13, 14, and 15, one discovers that a wide range of standards, tasks, and enablers are associated with the production of reports and/or contracts. For the 26 outputs categorized as reports or contracts, 31 different categories of standards were applied, 27 different categories of tasks were engaged in, and a combination of 78 different categories of knowledges, skills, and sensitivities were relied upon in their production. In the same vein, a total of 99 statements of standards were identified in relation to the 26 outputs analyzed, 351 statements of tasks were identified that were pursued in their production, and a total of 102 statements of knowledges, 140 statements of skills, and 73 statements of sensitivities were called upon in the course of their production.

The frequency with which particular categories of standards, tasks, and enablers were employed in producing the 26 reports analyzed can also be determined. The standards most frequently applied required that the goals established for the output be attained, that the product be complete in its content, that it be accepted by others working on the project and by the projects sponsor, and that it communicate to its audience clearly. While other output standards were also applied, those mentioned give some idea of the nature of standards associated with the

TABLE 10.1

An Illustration of the Linkage Between Class of Output and Class of Work Requirement Data

Coding Sets	Output and Work Requirement Categories	Freq.
DE J LM	Cluster Output Category Structure of Standards Primary Category of Standard	
01	Reports/Contracts	26
1	Output Standards	83
12	Goal attainment	10
13	Acceptance by others (in project)	9
01	Completeness of content	9
04	Communication and clarity	7
14	Acceptance by sponsor	7
08	Agreement/concurrence w/others	5
09	Lack of errors/discrepancies	5
16	Compares favorably	4
05	Utility or value	3
07	Personal satisfaction/feeling	3
11	Appropriate design/content	3
15	Compliance w/sponsor guideline	3
18	Satisfactory appearance	3
24	Terminology appropriate	3
17	Internally consistent	2
19	Logical criteria	2
21	Sources of variance controlled	2
02	Quantity of outputs/data	1
06	Acceptance by users	1
29	Meets design expectations	1
2	Process Standards	16
04	Deadlines are met	4
20	Performance respected	2
34	Impact of effort favorable	2
02	Personnel are satisfied	1
11	Costs consistent w/estimates	1
17	External enthusiasm evident	1
24	Costs acceptable for benefits	1
25	Staff reflect trust	1
35	Outputs distributed/requested	1
39	Evidence of pre-planning	1
40	Outputs published externally	1

cluster of outputs being considered. With respect to the standards held for the process of producing reports and contracts people in the field see it as important that deadlines be met, that performance be respected and that the impact of the effort involved in producing these outputs be favorable. For any other output cluster category that might be chosen the standards applied, while they might carry some of the same labels, will occur with different frequencies and reflect different priorities.

Given the standards associated with the outputs included under Reports/Contracts the next set of linkages that are meaningful relate to tasks. Of the 351 tasks involved in producing the 26 reports and/or contracts mentioned the ones most commonly engaged in center around Constructing and Assembling Components, Producing the Output itself, and Constructing and Using Measurement and Production Tools. The next most commonly pursued set of tasks revolved around the collection and processing of data. These tasks include the development, administration, and scoring of data instruments and the interpretation of results. Other clusters of tasks included such efforts as the assessment of output quality, with an emphasis on proofreading and editing, effecting accountability and quality control, designing the output, and clarifying the problem addressed. As in the case of standards, other outputs may require the performance of similar sets of tasks, but again, not in the same quantity or with the same set of priorities.

Having considered the standards held for Reports/Contracts and having identified the tasks involved in the production of those outputs to the standards held, the next level of linkage centers around the knowledges, skills, and sensitivities needed by project personnel to perform the tasks identified. The most commonly cited knowledges that a staff member must have pertain to the kinds of things that are taught in courses related to RDD&E, such as research design, and in courses covering technical and/or professional topics. The staff member also needs to know about the external variables surrounding the project in which the output is to be produced. A variety of other knowledges, though less frequently cited, are also relied upon. These relate to things learned in formal schooling, things learned about the project or its context, and things associated with the technical operation of a project.

Along with the knowledges mentioned, staff members responsible for producing reports and/or contracts need to have a variety of skills and sensitivities. By far the most frequently relied upon skill is that of writing. Other skills include finding fits among elements and integrating them, applying measurement tools, handling and analyzing data, and facilitating interaction between people. Sensitivities needed include an awareness of the interactions that occur between themselves and others, an awareness of the responses of the audience that the report or contract is targeted for, and an awareness of their own and others' needs. A wide range of other sensitivities is also called upon, but not as frequently as those mentioned. Again, these as well as the other sets of data can be found in Appendices 13, 14, and 15.

As the reader scans these appendices he will see that each output cluster is linked to a relatively unique set of work requirements. The standards, tasks, and enablers associated with the product cluster category Reports/Contracts, for example, differ quite dramatically in both quantity and kind from those associated with the event category Cooperative Relationships. It is these differences that demonstrate the power of outputs as a basis for organizing work requirement data.

The data presented in Table 10.1 as well as Appendices 13, 14, and 15, are reported in a highly summarized form. To further detail the distribution of standard, task, and enabler data, work requirement data have been organized for three cluster categories by the primary categories that they encompass. These data appear as Appendices 16, 17, and 18. Table 10.2 illustrates how the data are organized within those appendices and the linkage that exists between output and process standards and two of the primary output categories that fall within the cluster category Reports/Contracts. From the table it can be seen that 11 output standards and one process standard were cited for the two outputs identified by the primary category label Terminal Report. Five output standards and no process standards were cited for the three outputs identified by the primary category label Proposal. Further inspection of the table reveals that the two primary categories shown contain only five of the 26 outputs which fall within Cluster Category 101, and in combination account for only 16 output standards and one process standard. Considering the bulkiness of such data, and the small number of outputs on which it is based, the reader can appreciate the decision to present such anlayses for illustrative purposes only. The data presented in Appendices 16, 17, and 18 are valuable data, however, and they elaborate appreciably the data presented in Appendices 13, 14, and 15. The reader is encouraged to attend to these appendices carefully, both as a source of useful information about the production of specific classes of outputs and as an illustration of the kind of data summaries that are possible with the Oregon Studies data.

TABLE 10.2

An Illustration of the Linkage Between Class of Output and Class of Work Requirement Data, When Work Requirement Data are Ordered by Both Primary and Cluster Output Categories

Coding Sets	Output and Work Requirement Categories	Freq.
DE FGHI J LM	Cluster Output Category Primary Output Category Structure of STandards Primary Category of Standard	
01	Reports/Contracts	26
0006	Terminal Report	2
1	Output Standards	11
16	Compares favorably	3
19	Logical criteria	2
01	Completeness of content	1
12	Goal attainment	1
14	Acceptance by sponsor	1
15	Compliance w/sponsor guideline	1
18	Satisfactory appearance	1
24	Terminology appropriate	1
2	Process Standards	1
20	Performance respected	1
0007	Proposal	3
1	Output Standards	5
07	Personal satisfaction/feeling	1
08	Agreement/concurrence w/others	1
09	Lack of errors/discrepancies	1
14	Acceptance by sponsor	1
17	Internally consistent	1

Chapter 11

OUTPUT TREES

Chapter 11 is the second of the two chapters designed to illustrate the linkage between outputs and work requirement data and as such, represents the culminating data chapter within the volume. The data reported in the chapter are only illustrative, however, so it is also the shortest chapter in the volume.

It will be recalled that in the previous chapter classes of work requirement data were linked to classes of outputs. This provided, in the form of the appendices, separate, though exhaustive, summaries of the standards held for a particular class of output, the tasks engaged in to produce a particular class of output, and the knowledges, skills, and sensitivities relied upon to produce a particular class of output. It will also be recalled, however, (see Chapter 4, Fig. 4.4) that the model that guided the collection of output-work requirement data called for the linkage of all three classes of work requirements to a particular class of output simultaneously. This most complex linkage of output and work requirement data is referred to as an output tree, and represents both conceptually and empirically the major contribution of the Oregon Studies. That figure has been reproduced below as Figure 11.1, and that figure has been coupled with data as Figure 11.2.

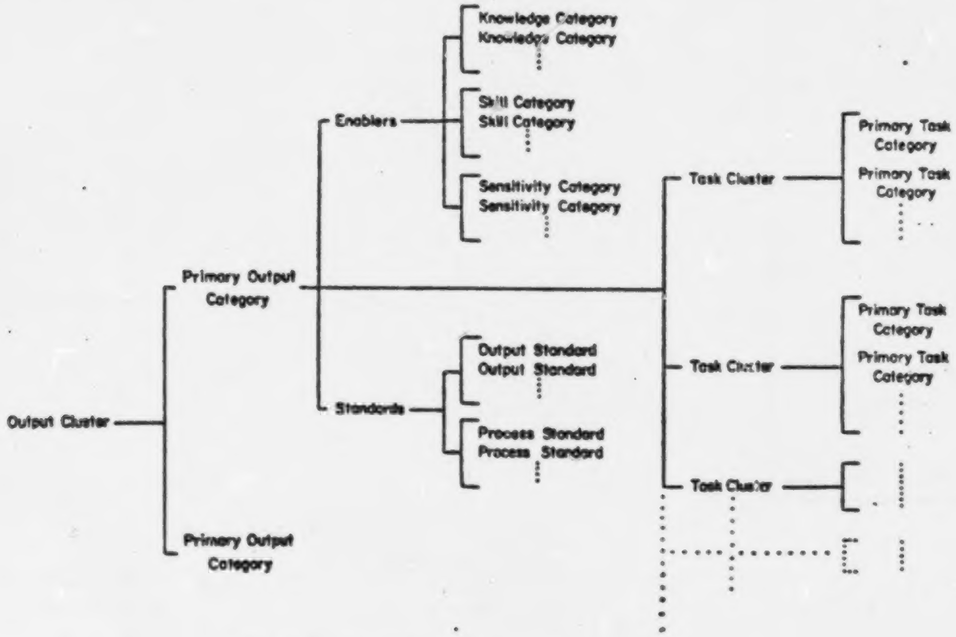

Knowledge Category
Knowledge Category
Skill Category
Skill Category
Sensitivity Category
Sensitivity Category
Enablers
Primary Task Category
Primary Task Category
Task Cluster
Primary Output Category
Primary Task Category
Primary Task Category
Output Standard
Output Standard
Task Cluster
Standards
Output Cluster
Process Standard
Process Standard
Task Cluster
Primary Output Category

FIG. 11.1. The linkage of output and work requirement data that constitutes an output tree.

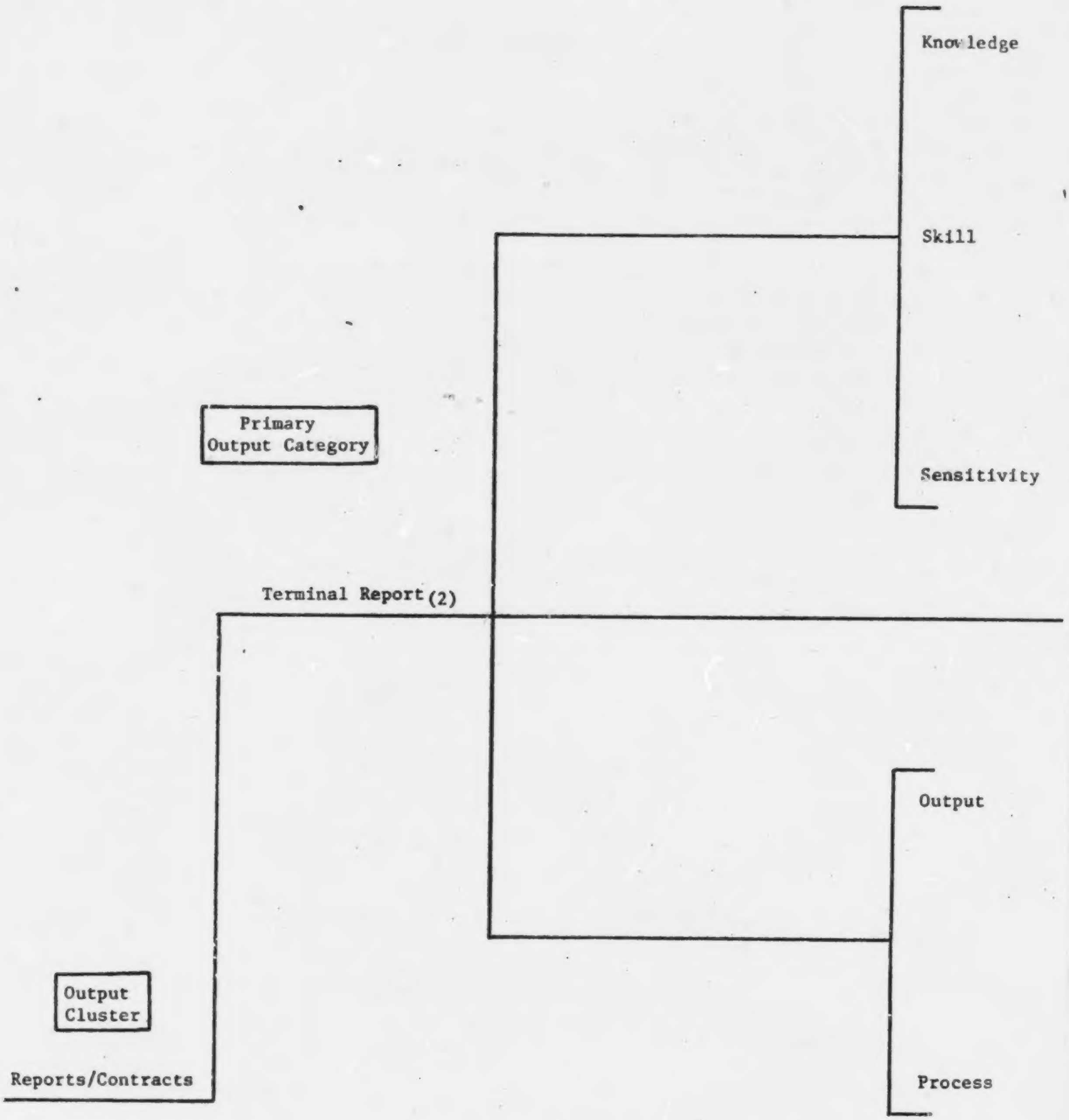
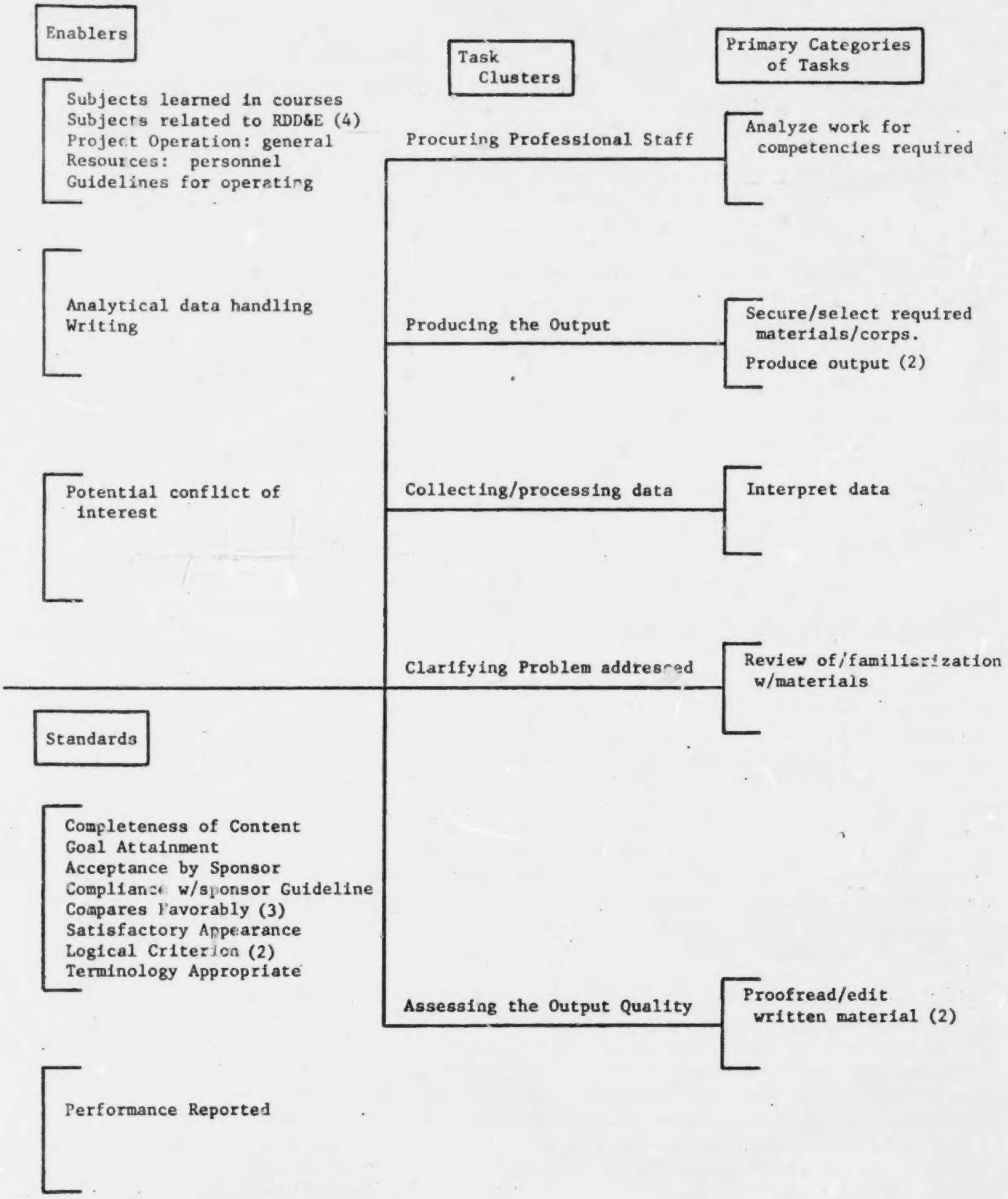

Knowledge
Skill
Sensitivity
Primary Output Category
Terminal Report (2)
Output
Process
Output Cluster
Reports/Contracts

FIG. 11.2. Work requirements associated a subclass of output cluster


Enablers
Subjects learned in courses
Subjects related to RDD&E (4)
Project Operation: general
Resources: personnel
Guidelines for operating
Analytical data handling
Writing
Potential conflict of interest
Standards
Completeness of Content
Goal Attainment
Acceptance by Sponsor
Compliance w/sponsor Guideline
Compares Favorably (3)
Satisfactory Appearance
Logical Criterion (2)
Terminology Appropriate
Performance Reported
Task Clusters
Procuring Professional Staff
Producing the Output
Collecting/processing data
Clarifying Problem addressed
Assessing the Output Quality
Primary Categories of Tasks
Analyze work for competencies required
Secure/select required materials/corps.
Produce output (2)
Interpret data
Review of/familiarization w/materials
Proofread/edit written material (2)

ith the preparation of Terminal Reports,
ategory 01, Reports/Contracts.

The data sets that appear within Figure 11.1 are by now familiar to the reader. Multiple primary categories are linked to output cluster categories, and multiple classes of standards, tasks, and enablers are linked to each primary category. The nature of the data that reside within these sets is also by now familiar. In combination, the data sets appearing in the figure are intended to represent the full array of work requirements associated with the production of a particular class of output. This array is an example of an output tree.

Figure 11.2 represents an application of the output tree concept displayed in Figure 11.1. In Figure 11.2 the output tree is focused on the primary output category Terminal Report, an instance of the output cluster category Reports/Contracts. Two terminal reports were analyzed during the course of the Oregon Studies and the work requirement data displayed in the figure are the work requirements identified as being associated with their preparation. The categories of knowledges, skills, and sensitivities required of personnel to prepare the two reports, the categories of tasks performed in their preparation, and the categories of standards applied to the process of their preparation as well as the reports themselves are listed on the right side of the tree by frequency of occurrence. The number appearing after a category label indicates the number of related work activities identified in relation to the production of the two reports. The data displayed in Figure 11.2 represent the sum total of work requirement data collected in relation to the two Terminal Reports studied.

The reader needs to be aware that both the nature and number of the categories listed in Figure 11.2, as well as the number of related work activities identified within each category, varies with the output cluster category chosen for analysis, the number of primary output categories linked to a particular cluster category, and the number of outputs classified within each primary output category. Thus, the work requirement data displayed in Figure 11.2 would take on a different character or pattern for another class of cluster category, or for classes of primary categories within the Reports/Contracts cluster. All classes of outputs analyzed, however, have an associated set of work requirement data, and in all cases these data can be displayed in the form of an output tree.

This property permits output trees to be created at the cluster category level, at the primary category level, and even at the individual output level. The creation of output trees at the cluster and primary category levels requires the interrogation of the data bank developed within the Oregon Studies. The creation of output trees at the individual output level requires the interrogation of the data reported in the case profiles. In the latter case it is also possible to identify the initial work requirement descriptions provided by project personnel interviewed that contribute the basis of all categorized data reported in the present volume.

Without access to the data files, the reader can generate an output tree in one of two ways. The first way is to turn to Appendices 13 through 18 and select, for a specific primary or cluster category of output, the work requirements associated with it. For the preparation of output trees at the cluster category level use Appendices 13,

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14, and 15. For the preparation of trees at the primary output level use Appendices 16, 17, and 18. The latter would produce trees that would carry approximately the same amount of information that appears in Figure 11.2. The former would carry a much heavier load of information and would consequently require greater space for display. The procedures performed in preparing trees is, however, the same in both cases. Trees can be created for classes of outputs other than those that appear in Appendices 13 through 18, but their preparation requires recourse to the data files.

The second way for a reader to produce an output tree is to turn to Volume IV, select a specific profile, choose any interviewed output in that profile, and obtain for that output the associated work requirements. It will soon become obvious, however, that that is a time consuming process and one of value primarily for the "craftsman" who wishes to pursue the production of a specific output to a specific standard of excellence. The preparation of output trees on the basis of the data presented in Appendices 13 through 18 is a reasonably simple task, and one that provides a product that has a great deal of utility for a large number of people.

In closing the discussion of output trees, it seems reasonable to caution the reader one more time to interpret all of the data presented in the Oregon Studies in light of the linkages that exist among data sets. Work requirement data, for example, in the absence of the outputs to which they are linked, cannot be expected to convey the same information as they do when associated with outputs. The meaning of any bit of data reported in the Oregon Studies, be it a specific task, a knowledge, or an output, is highly dependent upon the other data to which it is linked. This is not to imply that data sets treated independently are without value, but it is to imply that such treatment has limited value and that in order to grasp their full value they need to be seen in context.

Two formats for reporting data together with the context from which it was generated have emerged from the Studies, the format of a case profile and the format of an output tree. The former has been designed to accommodate all classes of data generated within the Studies on an individual project basis, and the latter has been designed to accommodate output linked data on either an individual project or cross project basis. For optimal utility, the reader is encouraged to treat the data presented in the Oregon Studies within their appropriate contexts.

Chapter 12

SPECIAL PURPOSE MAPS: SELECTED ANALYSIS

This chapter varies in format from those data chapters which have preceded it. During the course of the Oregon Studies individuals have presented to the project staff, both privately and through the medium of three "Review and Refinement" conferences a number of "Special" issues of immediate concern to them. A number of these issues, although of extreme concern, were impossible to detail as they called for evaluative classes of data, e.g., is one management organizational pattern better than another? A number of the issues raised were focused upon classes of data which had not assumed a central focus within the methodological procedures developed for the Oregon Studies. This chapter has as its focus, then, four issues which have been selected for further examination by the staff of the Oregon Studies. Selection was made based not only on the availability of data, but on the frequency with which the issues were raised, on the importance of the issues conceptually, and on the interest of the issues as judged by the staff of the Studies.

The first of the special purpose issues examined concerns the degree to which the variability of the output data is influenced by or attributable to the Context variables of Size and Setting. The Level, Function and Character of outputs are analyzed and discussed in reference to these two variables. This issue is of special interest primarily because of the conceptual issues raised in the Schalock-Sell paper contained in Volume III of the series reporting the Oregon Studies.

The second special issue examines the responses of project personnel to the questionnaire utilized by the Oregon Studies in order to determine work activities by general "position" on projects. These data are treated utilizing factor analytic techniques in a unique attempt to organize the activities associated with various positions as a means of determining categories of Jobs or "Job Roles." By treating this issue it was felt that the definition of job roles, utilizing the questionnaire data, presented not only an interesting challenge but might also provide an initial set of factors which might serve as the basis for future work. (The reader may be particulary interested in comparing the 12 "Task Clusters" identified by the AERA task force investigation with those identified by the Oregon Studies in this regard.)[1]

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[1] See reference: Worthen, B. R., Anderson, R. D. & Byers, Maureen L. A Study Of Selected Factors Related To The Training Of Researchers, Developers, Diffusers, And Evaluators In Education. Final Report. Grant No. OEG-0-71-0617(520). November 1971. American Educational Research Association.

The third issue which is dealt with utilizes as its organizing structure the linkage of Output, Work Requirement and People data. The initial organizer for discussion is the concept of Job Role. Job role can be seen to derive its meaning from these classes of data. In addition, however, a number of other concepts are also included within the discussion, such as "management" and "organizational structure." By forcing on this issue an opportunity was perceived to recombine People linked data with Output and Work Requirement linked data. While this process has been alluded to within this volume, Special Issue III is the first attempt to utilize this kind of linkage. This issue also allowed the staff to examine the relationships between a set of job role categories and a set of data which was collected without regard to job role.

The fourth issue focuses upon other uses to which the Oregon Studies data can be put. The three issues preceding this one cannot begin to cover the variability of questions to which the Studies data could be applied. This issue, then, attempts to describe the 3 major data sets and the possibilities which exist for their recombination with respect to any potential set of specific questions. This fourth issue should provide for the reader some additional insight into recombinations of the data which are possible.

Special Issue I: Context Variables: Size and Setting

To this point in Volume I people, outputs, and work requirements have been reviewed for the reader in terms of the range and frequency of categories by which the data is organized. The occurrences of people, output, and work requirement data have been further refined for the reader by organizing the data as it distributes itself by the context variable "Project Focus," i.e., research, development, etc. A number of other context variables were also utilized for classification purposes, including size and settings.

Special Issue I will address the question of the degree to which variance in projects exists as a function of the context variables of size and setting. The full range of categories of fiscal year funding, one of the Oregon Studies' measures of size, are enumerated in the first column. These size categories have been combined in other chapters of this volume for convenience in discussion. The category labels are presented in the middle column. The last column contains the number of projects falling within each category.

20,000 or less	- -	Small	(3)
20,001 - 100,000	- -	Small	(5)
100,001 - 225,000	- -	Medium	(6)
225,001 - 500,000	- -	Large	(3)
500,001 or over	- -	Large	(3)

The setting variable, as originally coded, utilized the eight categories enumerated below. The numbers of sites appearing within each category are indicated parenthetically.

1.	educational research and development centers	(2)
2.	regional education laboratories	(3)
3.	colleges and/or universities	(5)
4.	professional associations	(1)
5.	private non-profit organizations	(1)
6.	industry or commercial organizations	(4)
7.	public schools and/or school districts	(2)
8.	state departments of education.	(1)

As the reader can see by reviewing these categories, a variety of setting categories are presented, each of which includes a small number of sites. For purposes of data presentation and discussion, therefore, it was felt that a combining of categories was warranted. Categories 1 and 2, 3 and 4, 5 and 6, and 7 and 8 were combined for this purpose. The end result of this process is a set of four categories. The Project Focus distribution of the sites visited by the Oregon Studies is summarized within Table 12.1 as ordered by both setting and size.

TABLE 12.1

The Distribution of the Oregon Studies Project Sample by Project Size and Setting as Ordered Within Project Focus

Dimensions of the Variables	Project Focus			
	Research	Development	Diffusion	Evaluation
Project Size				
20,000 or less	3	–	–	–
20,001 to 100,000	1	2	–	2
100,001 to 225,000	1	4	1	–
225,001 to 500,000	–	1	2	–
500,001 or over	–	–	2	1
Project Setting				
R&D Labs/Centers	1	1	1	2
Colleges and/or Universities	3	3	–	–
Private Organizations	1	1	3	–
Public Schools or School Districts	–	2	1	1

Table 12.1 should help the reader to understand the nature of the sample acquired as well as its distribution by Project Focus.

It is fairly clear from Table 12.1 that the sample, as distributed by project focus, incorporates at least three of the four classes of settings for all but evaluation projects. In reviewing the size data from Table 12.1, it can be noted that the research projects tended to be in the medium to small end of the classification scale, the development projects tended to cluster toward the medium end, and the diffusion sites tended to be very large. The evaluation sites, on the other hand, represent the two extremes of the scale, two sites being classified as small and one site being classified as large.

Table 12.2 orders the sites sampled by the Oregon Studies by just size and setting.

TABLE 12.2

The Distribution of the Oregon Studies Project Sample as
Organized Within Project Size by Project Setting

Project Size	Project Setting			
	R&D Labs/ Centers	Colleges and/or Universities	Private Organizations	Public Schools or School Districts
20,000 or less	1	1	1	-
20,001 to 100,000	2	3	-	-
100,001 to 225,000	1	2	1	2
225,001 to 500,000	1	-	2	-
500,001 or over	-	-	1	2

Table 12.2 indicates that the smaller projects seem to be clustered within R&D labs and centers, and colleges and universities, while the very large projects tend to be dealt with by both private organizations and school districts. The medium size projects appear to be distributed fairly evenly across all categories.

In attempting to view the additional context variables of size and setting, and any variations that might be attributed to them, the unit of analysis question once again presents itself. As should be obvious to the reader, any or all of the variables discussed in Chapters 6, 7, and 8, and any or all of the dimensions of those variables could be organized and summarized in relation to project size and setting. In short all of the data from earlier chapters of this volume could be related to each of these context variables. Given a reasonable limitation on chapter length, however, a choice had to be made from among these variables. With Outputs serving both as the descriptor of what people are producing and the organizer for the Work Requirement data it was felt that examining the Output data first might be most expedient in terms of reviewing other classes of data. Instead of presenting output data in the same degree of detail and explicitness as that presented within Chapter 7, however, the various classification dimensions utilized to describe outputs will serve as the variables of concern. These include output level, function, and character. These three descriptors of outputs were dealt with within Chapter 9 of this volume in relation to Project Focus. The reader is, therefore, referred to Chapter 9 in order that he might compare the data presented on size and setting with that already presented with respect to focus.

Table 12.3 displays the dimensions of outputs as they distribute by project size.

TABLE 12.3

Project Size as Described by the Level, Function and Character of Identified Outputs

Dimensions of the Variables	Project Size				
	20,000 or less (3)[a]	20,000 to 100,000 (5)	100,001 to 225,000 (6)	225,001 to 500,000 (3)	500,001 or over (3)
			Output Level		
Focal	11 (15%)[b]	34 (15%)	25 (13%)	20 (14%)	44 (13%)
Component	12 (16%)	64 (29%)	29 (15%)	40 (27%)	72 (22%)
Facilitating	51 (69%)	125 (56%)	134 (71%)	88 (59%)	213 (65%)
			Output Function		
Policy-Setting	1 (1%)	4 (2%)	3 (2%)	2 (1%)	16 (5%)
Management	47 (64%)	101 (45%)	124 (66%)	84 (57%)	158 (48%)
Production	26 (35%)	118 (53%)	61 (33%)	62 (42%)	155 (47%)
			Output Character		
Knowledge	25 (34%)	3 (1%)	7 (4%)	1 (1%)	4 (1%)
Technology	30 (41%)	162 (73%)	119 (63%)	93 (63%)	172 (52%)
Implementation	5 (7%)	6 (3%)	23 (12%)	19 (13%)	83 (25%)
Information	14 (19%)	52 (23%)	39 (21%)	35 (24%)	70 (21%)

[a] The number of projects represented within each setting.

[b] The number 11 in this column reports the exact number of outputs classified as focal within the category. For purposes of discussion these raw data have been adjusted for the different numbers of sites per category and converted to percentages.

Table 12.3 provides for the reader two sets of data within each cell entry. From Table 12.3 the reader can see that for projects funded at a level of $20,000 or less, for example, 11 focal outputs were identified. The percentage figures shown were arrived at by calculating the average number of focal outputs per project and dividing that number by the average number of outputs identified for each size category. By treating the data in this manner, therefore, the various classifications of project size can be compared on an equal or similar basis. The reader can see that there is little variation in the percentage of outputs classified as focal, across size categories, and that both the component level and the facilitating level of outputs, while scattering a little more widely in terms of percentage, present no clear cut trend.

In reviewing output function data it is fairly clear that the number of outputs classified as policy setting begin to play a somewhat more prominent role within projects of $500,000 or more per fiscal year. It is also interesting to note that for those projects funded for over $500,000 the management and production functions divide fairly evenly in terms of output percentages. The split between management and production outputs for other sizes of projects does not appear to be as equal.

In reviewing the data on output character, results which might not have been anticipated are in evidence. For instance, 34% of the outputs produced by projects of $20,000 or less per fiscal year are classified as knowledge outputs, while 64% of the same set of outputs were classified as serving a management function. This knowledge categorization is consistent with the research focus of these projects. As was demonstrated throughout the earlier chapters of this volume, there is a heavy emphasis on technology outputs irrespective of project focus. The percentage of technology outputs across project size as displayed within Table 12.3 tend to verify this point. Percentage data on outputs classified as implementation in character appear to suggest a trend. As the size of project increased the percentage of outputs classified as implementation also tended to increase. This is the only "trend" represented within the table. These data should be interpreted in light of the fact that the larger projects, for the most part, focus on development and diffusion (See Table 12.1).

Reviewing the data in Table 12.3 vertically allows another level of analysis. Despite the project focus the reader can see from Table 12.3 that the "balance" of outputs as classified by their character shifts as the dollar amounts shift. This could be interpreted as representing a trend away from the production of some focal output to the use of whatever is being produced. Such review shows that for projects of $500,000 or more per fiscal year the character of outputs is somewhat more diversified, 52% are classified as technology, 25% as implementation, and 21% as information. Once again the reader is directed to Table 12.1 as an aid in interpreting these results.

In sum then, it would appear that the percentage of outputs classified as focal, component, and facilitating remain fairly well distributed irrespective of project size. The function of outputs begins to show some differentiation across project size, with policy setting accounting for a greater percentage of outputs as size increases, and with the balance between management and production classifications of outputs becoming more even as the project size increased. In reviewing output data classified by character a number of distinctions were also observed. The most interesting trend represented by these data is the increased percentage of outputs classified as having a character of implementation as the size of the projects increases. In reading Table 12.3 vertically a balancing of the character of outputs as project size increases becomes evident.

Setting

Another interesting review of output data is provided through use of the context variable Setting. Table 12.4 organizes the output data on the basis of project setting in much the same way as did Table 12.3 for project size.

TABLE 12.4

Project Setting as described by the Level, Function and Character of Identified Outputs

Dimensions of the Viables	Project Setting			
	R&D Labs/ Centers (5)[a]	Colleges and/or Universities (6)	Private Organizations (5)	Public Schools or School Districts (4
		Output Level		
Focal	20 (11%)[b]	36 (16%)	49 (14%)	29 (14%)
Component	26 (14%)	67 (20%)	69 (20%)	55 (26%)
Facilitating	136 (75%)	124 (55%)	224 (66%)	127 (60%)
		Output Function		
Policy-Setting	4 (2%)	4 (2%)	14 (4%)	4 (2%)
Management	111 (61%)	116 (51%)	169 (49%)	118 (56%)
Production	67 (37%)	107 (47%)	159 (47%)	89 (42%)
		Output Character		
Knowledge	13 (7%)	18 (8%)	9 (3%)	0 (0%)
Technology	105 (68%)	164 (72%)	181 (53%)	126 (60%)
Implementation	15 (8%)	15 (7%)	84 (25%)	22 (10%)
Information	49 (27%)	30 (13%)	68 (20%)	63 (30%)

[a] The number of projects represented within each setting.

[b] The number 20 reports the exact number of outputs classified as Focal within the R&D Lab/Center category. For purposes of discussion these raw data have been adjusted for the different numbers of sites per category and converted to percentages.

As can be seen from this table the percentage of outputs classed as focal does not vary to any great degree across project setting, the range being from 11 to 16 percent. The percentages of outputs classed as component, however, do tend to range more widely given the different project settings, the low being 14%, the high being 30%. The greatest percentage of facilitating outputs is produced by the R&D lab/centers. Moving downward in the table to the Function of Output, it can be seen that this same project setting, R&D lab/centers, produced the largest percentage of outputs classified as management, 61%. It is also clear that the largest percentage of outputs classified as policy setting occurred with private organizations. It would also appear that private organizations give equal emphasis to outputs classed as management and outputs classed as production. Across all project settings, however, it is clear that outputs classed as management were always greater in percentage then those classed as production. The outputs classed as management are just as difficult to interpret using project setting as an organizer as they are using project size. A review of Table 12.2 shows that while R&D labs and centers have the highest percentage of management classified outputs, they do not include projects in the range of $500,000 or over per fiscal year. In fact the projects undertaken within the sample of R&D labs and centers tend to be on the medium to medium-low size. The private organizations, which appear to give equal emphasis to management and production classified outputs, include at least one project in the size range of over $500,000. The projects undertaken by private organizations within the sample can be classed as medium to medium-high in size.

The next section of data contained within Table 12.4 deals with the output classification of character. As can be seen from the table, R&D Lab/Centers and Colleges and/or Universities would appear to have the greatest percentage of outputs classified as knowledge. Colleges and/or Universities also appear to have the highest percentage of outputs which were classified as technology in character. The implementation classification once again provides some interesting data. It would appear that private organizations represent the only category dealing with implementation to any significant extent. In looking back at Table 12.2, it can be seen that the private organization data is obtained from a wide diversity of projects as described by size. From a review of Table 12.1 it is evident that the private organization data come from a research, a development, and three diffusion projects. The heavy emphasis on diffusion in private organizations might explain the character data represented within Table 12.4. It is, however, somewhat more difficult to interpret the 10% figure for implementation within the Public Schools or School Districts classification. A review of Table 12.1 shows that the public school sample included two development, one diffusion, and one evaluation project, all of which fall within the medium to large category in terms of dollars. It would appear from these data that the projects undertaken within the public school or district setting are more concerned with the provision of information than with implementation. Again this is somewhat difficult to interpret given the distribution of these projects as noted within Table 12.1 and 12.2.

In summary, it might be pointed out that colleges and universities within this sample were primarily concerned with the production technology outputs, as were the R&D labs and centers. Private organizations, on the other hand, appeared to be more concerned with implementation related outputs, while public schools and school districts were apparently more concerned with the generation of information. Interesting as these data might be the reader must keep in mind that until a much larger sample rounds out the cell entries within Tables 12.1 and 12.2, the prediction or the identification of the causes of such relationships as are dipicted within Tables 12.3 and 12.4 remains quite speculative.

Special Issue II: Work Roles of RDD&E Personnel

The many problems associated with specifying "job role" and the variations which were associated with it, led the Oregon Studies away from the utilization of this concept as a prime organizer of data. Its utility as a convinient organizer of personnel, however, kept the question of definition open during the course of the Oregon Studies. It was felt that if such variables as management style, organizational pattern, etc. could be removed as contributing sources of variation in the definition of job role, there might be some means of coming back to the use of the concept as an organizer of data.

Responses on the significance of several categories of activities were obtained from 90 project personnel through the use of Form 04, the "General Position Activities Questionnaire." Availability of this data, provided by use of the 8-interval Hemphill scale of item significance, made possible an opportunity to explore the issue of how these respondents tended to cluster in terms of their responses to each activity. If significant clustering of people could be identified, a start would be provided toward the empirical definition of job roles within educational RDD&E.

At the suggestion of Dr. Paul D. Hood,[1] a factor analysis of Form 04 responses was attempted. An intercorrelation matrix based on 87 usable responses was generated to form the basis of a Q-type factor analysis. Rather than factoring the activity items, this approach would factor the people who responded to them. Interest was in defining the significant characteristics of job roles of personnel, not of interrelated or covarying job tasks.

The Q-type analysis was performed using the BIMED General Factor Analysis program, BMD03M, on the CDC 3300 computer at the Oregon State University Computer Center. This program included computer rotation of the resultant factor matrix.

Since this analysis effort was only exploratory, only the highlights of the factor results are presented in this volume. If the reader wishes, he may contact Teaching Research for copies of the computed intercorrelation matrix, eigenvalues, eigenvectors, unrotated factor matrix, and rotated factor matrix. The factor matrix contained 23 factors, accounting for 86 percent of the total variance. For exploratory analysis purposes, only the first ten factors were examined for definitional implications. These factors are listed below:

Factor 1: Staff Worker (low-level data analysis and instrument development)

Factor 2: Staff Worker (high-level statistical design, analysis and instrument design)

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[1] Personal communication, March 1971.

Factor 3: Supervisor (high-level data analysis)

Factor 4: Manager (mid-management, with staff personnel contact)

Factor 5: Management Representative (outside contacts)

Factor 6: Staff Worker (literature abstractor)

Factor 7: Undefined (possibly "team leader")

Factor 8: Information Disseminator

Factor 9: Undefined (possibly "research aide")

Factor 10: Undefined (possibly "new doctorate-level employee with statistical skills")

The ten factors listed accounted for 62% of the total variance. Seventy five of the 87 persons were represented with factor loadings of ± .30 or greater. Factor 1 accounted for 18% of the variance. Appendix 19 contains the factor loading of each person who loaded significantly on each factor. Personnel background information used in collating this data was based on Items 5, (sex) 7, (highest degree) 46, (relationships to primary contractual project) and 47 (coding Set X) of questionnaire Form 03 (see Appendix 2, Volume V). In addition, Appendix 20 summarizes the nine General Categories of work and the Specific Categories of work by Project Focus, Project Level and "Role."

A brief summary of these ten factors is given below. This summary includes a factor label (where reasonable to do so), a narrative description of each job role represented by these factors, and the top five positive and negative discriminating items. As may be noted in the factor labeling and narrative description, three of the ten factors do not lend themselves to assurance of a job role definition. The other seven factors, however, appeared reasonably certain of role characteristics, including roles for the production staff as well as for various levels and types of managers within projects.

Factor 1: Staff Worker (low-level data analysis and instrument development)

This factor is characterized primarily by performance of activities involving the analysis of data, including (in descending order of factor differentiation) such features as measures of central tendency, frequency tallies, correlation coefficients, item analysis, simple analysis of variance, simple tests of significance of observed differences, and non-quantified information. It includes some development of test items and construction of questionnaires. These factor activities are distinguished from supervisory functions, which are clustered at the opposite polar end of this factor. The factor appears to represent a job role in which females outnumbered males, the bachelor degree tends to be the highest academic level, participants are regular members of the project staff, and the position generally does not occur in diffusion-focused projects.

Factor 2: Staff Worker (high-level statistical design, analysis, and instrument design)

This factor is characterized primarily by performance of activities involving the design and analysis of relatively sophisticated statistical treatments. Design includes issues of sampling, designating the general statistical treatments to be used, and computer system models for the data. Data analysis includes such features as analysis of variance, simple tallies, non-quantified information, regression analysis, and item analyses. Accompanying the statistical design is substantial involvement in developing observational techniques, as well as some activity in constructing questionnaires, test items, and interview outlines and schedules. These factor activities are distinguished from project management functions, which are clustered at the opposite polar end of this factor (particularly involving writing and coordinating activities). The factor role occurred only in evaluation and development projects, and individuals with highest factor loadings were not regular members of the project but were lending their expertise from within the total agency.

Factor 3: Supervisor (high-level data analysis)

This factor is characterized primarily by performance of many of the same statistical design and analysis activities of Factor 2, but also including the element of staff supervision activities. Design includes issues of computer system models for the data and designating the general statistical treatments to be used. Data analysis includes such features as correlations, simple tests of significance of observed differences, analysis of variance, measures of central tendency, regression analysis, frequency tallies, and item analyses. Supervision includes the allocation of responsibilities to project personnel and review of staff performance. These factor activities are distinguished from those involving the tryout of new curriculum developments at the level of classroom contact, which are clustered at the opposite polar end of this factor. The factor appears to represent a job role involved primarily in research or evaluation projects, rather than in development or diffusion projects.

Factor 4: Manager (mid-management, with staff personnel contact)

This factor is characterized primarily by performance of management activities involving direct personal contact with staff and others. Writing of research proposals and reading of inhouse materials are of high significance. Staff procurement and development are the concern, as well as a variety of project coordinating functions. These factor activities are distinguished from a project director's managerial functions involving project conceptual design and reporting, which are clustered at the opposite polar end of this factor. The factor appears to represent a middle-management job role involved primarily in development projects, but not generally in research and evaluation projects. Consistent with the mid-management tendency of the factor, personnel generally are males with master's degrees, not with doctorate degrees.

Factor 5: Management Representative (outside contacts)

This factor is characterized primarily by performance of activities involving contacts outside of the project itself. Thus, contacts with higher agency management, funding sponsor, and visiting personnel are involved, as are presentations made at professional meetings. These factor activities are distinguished from those involving project data collection, development of data collection instruments, and designing/ planning of procedural activities for the project. The factor appears to represent a job role involved in development or diffusion projects, but not generally in research or evaluation, though the personal prestige of the individual and of his efforts in other projects may cause some apparent deviation from this pattern. Both master and doctorate levels of academic attainment are represented.

Factor 6: Staff Worker (literature abstractor)

This factor is characterized primarily by performance of reading activities. While obviously occurring at the ERIC facility, three other development or diffusion projects also contained this job role. Scholarly essays, inhouse material, general literature surveying, and methodological documents were the subjects of this reading function. These factor activities are distinguished from those involving the design and development of empirical studies. The factor, at both polar extremes, appears to represent a job role not involved in research projects, though no research projects were examined in their early formative stage. Females tend to predominate in this job role.

Factor 7: Undefined, but possibly "team leader"

This factor is characterized primarily by performance of what might be termed "team leader" activities. Clustering of personnel characteristics and of activity significance is meager, making interpretation of this factor uncertain. With only one person loading on the negative side of the factor, contrasts are potentially unreliable. However, predominant positive activities did include the scheduling of project activities and the allocation of responsibilities to project personnel, as well as some degree of designing and planning of project procedures. Writing tasks involving correspondence and interim, status, or periodic reports were rated as highly significant. Collecting and analyzing data were not a major part of the factor, nor was the development of research tools or other information-gathering instruments. Diffusion projects were the dominant vehicle for this job role.

Factor 8: Information Disseminator

This factor is characterized primarily by performance of communicative activities, both oral and written. However, with only two persons loading on the positive side of this factor, and their factor loadings not exceeding .36, interpretation of this factor is somewhat hesitant. The predominance of communicative tasks, nevertheless, does tend to support the factor definition as being highly related to information diffusion job functions, though a wide variety of other types of activities also appear as part of the job. Particularly significant are teaching functions in classrooms, seminars or workshops, and professional meetings. Generally of a non-quantitative nature, the job activities tend to occur in a limited fashion in diffusion or development projects, but not in evaluation or research projects.

Factor 9: Undefined, but possibly "research aide"

This factor is characterized primarily by a seeming lack of involvement in the project efforts and mission, with the reading of recent project-related research, methodological documents, inhouse materials, and scholarly essays as the predominant activities. Some activity in developing project methodologies and in establishing contact with other personnel or agencies is considered relevant, but all other specific activities were rated of low significance. Supervision and teaching were generally not part of the job. The lack of individuals loading positively on this factor makes firm definition of the job role uncertain, however. Persons at the opposite polar extreme of this factor were of the order of project directors and managers, heavily involved in the project efforts. Neither research nor evaluation projects were involved in either polar extreme of this factor.

Factor 10: Undefined, but possibly "new doctorate-level employee with statistical skills"

This factor is characterized primarily by a concentration of performance on high-level data collection and statistical analysis, as opposed to top-level management of several projects within a large R&D agency. Procedural design functions are a strong part of the job, but most other features are of relatively low significance. Again, the sparsity of persons entering into the makeup of this factor prevents serious contrasts and factor definition. However, both persons with high negative loadings on the factor were well-established Principal Investigators. All persons held the doctorate degree. The positive side tends to appear like a recent graduate being used purely in the realm of empirical investigation, with little writing or supervising assignments as yet.

Obviously, these factors need further examination before firm conclusions may be drawn about their meaning. It is of interest to note the extent to which the factors have meaning on the basis of personal knowledge of each person represented. Interviewers from the Oregon Studies examined each factor and the personnel they represented. Clustered job roles were in their judgment very apparent and real. Further research, using more project personnel as well as an improved listing of work activities, would appear to be desirable. A significant improvement in the Form 04 listing can readily be provided by adding the 21 items from Form 04-A to those used, and by examining the 3722 task statements and the 280 primary task categories that were generated by the Oregon Studies.

The exploratory nature of this effort to cluster job roles is emphasized to prevent the reader from making unwarranted conclusions on the basis of these results. Activity statements were conceived prior to going out onsite and gathering actual performance statements. Thus, the activity statements on questionnaire Form 04 tend to overemphasize the traditional professional activities at the expense of diffusion and development activities, and at the expense of those functions performed by persons trained only to the bachelors degree level. The ability to specify statistical efforts in some detail also allowed such items to assume more power in differentiating job roles than may be the actual case. Now that specific task statements are available (through the overall effort of the Oregon Studies and other complementary projects sponsored by USOE) there is a firm basis for revising the inventory of RDD&E activities to yield a more comprehensive and specific set of items on which to differentiate job roles.

Special Issue III: Job Roles - Outputs and Work Requirements

Quite early in the course of the Oregon Studies it was discovered that similar job role categories were invariably defined differently by the various projects visited. It was not uncommon to find equivalent job role titles across projects and, at the same time, to find different activities being engaged in by the individuals holding these similar titles. Job role titles varied to such an extent that it became impossible to deal logically with the resultant data. In short, the concept was expected to provide a discriminative power which would enable data to be accurately categorized, but early data from the Studies indicated that such was not the case.

The issue discussed here will address the relationship between job roles as coded on the Form 03 questionnaire and the output and work requirement data collected independently from job role. The use of job role, as described in the previous section of this chapter, provides the reader with some commonly used organizers as pivotal points from which to review the output and work requirement data. It also provides an opportunity for the reader to judge for himself the advisability of abandoning or reconceptualizing job role as an organizer of data. It also provides the opportunity to discuss management and organizational structures which are based upon job role types of categories.

As an integral part of the interview process of the Oregon Studies each interviewee was classified as to his job role. Eight categories of job role were utilized for purposes of classification. These are listed below with the number of individual interviewees classified within each category appearing in parentheses. The classification category of an interviewee, although initially suggested by the interviewer from the Oregon Studies, was verified with the interviewee. If a discrepancy in role definition existed, it was mutually resolved and the coding was modified accordingly.

Principal Investigator	(14)
Project Director	(12)
Top Level Project Manager	(25)
First-line Supervisor	(5)
Professional Staff Member	(48)
Clerical Support Staff	(1)
Technical Support Staff	(4)
Advisor or Consultant	(6)

"High Level Managers" constitute the first three categories of job role and "Low Level Managers" constitute the next two categories when the data on job roles is clustered for purposes of analysis or interpretation. The last three categories listed above are excluded from discussion in Issue III.

Table 12.5 presents output data classified by structure as distributed by job roles. As with earlier discussions of data, the raw data and the data indicating percentages (which have been adjusted for varying numbers of individuals) are presented within the table. From the table it can be seen that less than 50% of the outputs of individuals classified within the first two categories of job role were coded as products. The remainder of the outputs of the first two classes were fairly well distributed between events and conditions. The first two categories of individuals are, then, apparently primarily concerned with "facilitating" in the roles that they play. They are responsible for establishing and maintaining a series of events and conditions which promote and insure that the work associated with the contracted for outputs of the project are successfully accomplished. Events and conditions data refer to such responsibilities as "staff morale," "staff meetings," etc.

Table 12.5 The Structure of Outputs as ordered by Job Role

Job Role	Output Structure		
	Product	Event	Condition
Principal Investigator (14)[a]	20 (48%)[b]	10 (24%)	12 (29%)
Project Director (12)	23 (50%)	10 (22%)	13 (28%)
Top Level Project Manager (25)	40 (73%)	5 (9%)	10 (18%)
First Line Supervisor (5)	7 (70%)	1 (10%)	2 (20%)
Professional Staff Member (48)	80 (81%)	11 (12%)	2 (2%)
Clerical Support Staff (1)	1 (100%)	- -	- -
Technical Support Staff (4)	7 (78%)	2 (22%)	- -
Advisor or Consultant (6)	3 (60%)	1 (21%)	1 (21%)

[a] The number of individuals classified within the category.
[b] The number 20 represents the exact number of Outputs classified as Product within the Principal Investigator. For purposes of discussion these raw data have been transferred to percentages in order to account for the different numbers of individuals within each category.

For the next two categories of job role, i.e., top level project manager and first line supervisor, approximately 25% more outputs are coded as products than for the first two categories of job roles. While personnel in these two categories of job role also generate a substantial number of conditions, it would appear that they are responsible for significantly fewer events than were the first two categories of job role mentioned. Personnel in this second clustering of job role are more responsible for producing product outputs more than they are with the establishment of events. Personnel falling within the job role classification "professional staff member" clearly devote the majority of their energy to outputs classified as products. The concern with conditions in this category is minimal, as is the concern with events. As might be expected, clerical support staff were totally product oriented. The technical support staff, while primarily responsible for outputs classified as products, also had 22% of their outputs devoted to staging events. The advisor or consultant job role category is very similar in percentage distribution to the principal investigator and project director categories. This would give some indication of the nature of the advising or consultation help derived from such individuals.

The data represented in Table 12.5 indicate a number of interesting trends. It would appear that the job role classifications "principal investigator" and "project director" are concerned with the establishment and maintenance of facilitating events and conditions. Scanning down the table of job role makes clear that responsibility is increasingly held for products with less and less emphasis on the production events and conditions. This table suggests that there are differences between the job role categories utilized and, in fact, there may be differences in the functions performed by the individuals filling these job role categories.

If individuals in various job roles are differentiated on the basis of establishing and maintaining facilitating events and conditions, the question might be raised, "Is it possible to differentiate between job roles on the basis of the level of outputs produced?" Table 12.6

Table 12.6 The Level of Outputs as ordered by Job Role

Job Role	Output Level		
	Focal	Component	Facilitating
Principal Investigator (14)[a]	6 (14%)[b]	2 (5%)	34 (81%)
Project Director (12)	7 (15%)	1 (2%)	38 (83%)
Top Level Project Manager (25)	10 (18%)	16 (29%)	29 (53%)
First Line Supervisor (5)	1 (10%)	3 (30%)	6 (60%)
Professional Staff Member (48)	14 (15%)	29 (31%)	50 (54%)
Clerical Support Staff (1)	- -	1 (100%)	- -
Technical Support Staff (4)	2 (22%)	1 (11%)	6 (67%)
Advisor or Consultant (6)	- -	1 (20%)	4 (81%)

[a] The number of individuals classified within the category.

[b] The number 6 represents the exact number of Outputs classified as Focal within the Principal Investigator. For purposes of discussion these raw data have been transferred to percentages in order to account for the different numbers of individuals within each category.

organizes the output data as classified by the focal, component and facilitating levels by the same set of job role categories introduced previously. By scanning the column showing the percentage of focal outputs it can be seen that there is little deviation on the basis of job role. With respect to the component output level, however, it is clear that personnel in the first two categories of job role have a very small percentage of their outputs classified as component. The next three categories of job role, however, would appear not to vary significantly in the percentage of outputs so classified. The last column of outputs shows clearly that the principal investigator and project director job roles have a large percentage of their outputs classified as facilitating. While top level project managers, first line supervisors and professional staff members also have more than 50% of their outputs so classified, the hypothesis raised in discussing the data within Table 12.5 would still appear to be viable. It is interesting to note that the technical support staff category also has a very large percentage of outputs classified as facilitating. The percentages associated with advisor and consultants also begins to provide additional clarity in terms of the utilization made of the individuals.

As was pointed out earlier within this discussion, the output data as ordered by output function within Chapter 9 indicated that more than 50% of the outputs identified across all 20 project sites were classified as management. Table 12.7 organizes the output function data as it distributes by the job role categories. Data from the

Table 12.7 The Function of Outputs as ordered by Job Role

Job Role	Output Function		
	Policy Setting	Management	Production
Principal Investigator (14)[a]	3 (7%)	33 (79%)	6 (14%)
Project Director (12)	3 (7%)	35 (76%)	8 (18%)
Top Level Project Manager (25)	- -	31 (56%)	24 (44%)
First Line Supervisor (5)	- -	5 (50%)	5 (50%)
Professional Staff Member (48)	- -	34 (37%)	59 (63%)
Clerical Support Staff (1)	- -	- -	1 (100%)
Technical Support Staff (4)	- -	5 (56%)	4 (44%)
Advisor or Consultant (6)	- -	4 (81%)	1 (21%)

[a] The number of individuals classified within the category.
[b] The number 3 represents the exact number of Outputs classified as Policy-Setting within the Principal Investigator. For purposes of discussion these raw data have been transferred to percentages in order to account for the different numbers of individuals within each category.

table indicate that policy setting occurs only in relation to the first two categories of job role. Also within those two categories the primary emphasis is on management classified outputs. The top level project manager and first line supervisor appear to fairly well divide their production of outputs between those classified as management and those classified as production.

Professional staff members appear to have a greater percentage of outputs classified as production than any other job role category. The clerical and technical support staff data are self explanatory. Individuals classified as advisors and/or consultants appear to deal primarily with management related outputs. As the table shows, all job role categories have management classified outputs identified with them. It is also clear from the table that there is some degree of differentiation among the job role categories. For example, policy-setting as a class of outputs was linked to only the first two categories of job role. The table also shows that the percentage of management outputs tends to decrease from Principal Investigator to Professional Staff Member while the percentage of production classed outputs tends to increase.

It is at this point that these data begin to point to some of the ambiguities that exist in the data which make up job role descriptions. If similar types of outputs are of concern to all personnel irrespective of their job roles, to have classified such data on the basis of job role not only would have given a faulty picture of the actual nature of the data but, and perhaps more importantly, eliminated the possibility of looking at the similarities of the outputs across job roles.

Table 12.8 organizes for the reader the Character of outputs as ordered by individuals' job roles. Previous chapters have referred to the fact that there is an emphasis on technology classed outputs irrespective of project focus. This would also appear to be the case with the job role data. The only job role category which has less than 50% of the outputs classed as technology is First Line Supervisor.

Within Table 12.8 four categories of job role are listed which have none of their outputs classified as knowledge. The reader is encouraged to review the remainder of the table from the point of view of these null sets and the sets which have very low percentages. It is of interest to conjecture about what the data would appear to be in terms of output character if this table could be reorganized utilizing such additional sorting categories as project focus or setting. It is simply unclear as to whether or not any further differentiation of the data would be forthcoming with such a further split of the data.

Thus far in the discussion of this special issue, output data has been reviewed as it is clustered by the various job role categories. The data presented some potentially useful differentiation between job roles when utilizing structure, level, and function outputs for comparison. It also seems clear from the data that there is no sharp distinction between individuals who might be called managers and individuals

Table 12.8 The Character of Outputs as ordered by Job Role

Job Role	Output Character			
	Knowledge	Technology	Implementation	Information
Principal Investigator (14)[a]	7 (17%)[b]	26 (62%)	5 (12%)	4 (10%)
Project Director (12)	7 (15%)	23 (50%)	9 (20%)	7 (15%)
Top Level Project Manager (25)	1 (2%)	36 (66%)	8 (15%)	10 (18%)
First Line Supervisor (5)	- -	4 (40%)	2 (20%)	4 (40%)
Professional Staff Member (48)	2 (22%)	70 (75%)	7 (8%)	14 (15%)
Clerical Support Staff (1)	- -	1 (100%)	- -	- -
Technical Support Staff (4)	- -	5 (56%)	3 (33%)	1 (11%)
Advisor or Consultant (6)	- -	4 (81%)	- -	1 (21%)

[a] The number of individuals classified within the category.

[b] The number 7 represents the exact number of Outputs classified as Knowledge within the Principal Investigator. For purposes of discussion these raw data have been transferred to percentages in order to account for the different numbers of individuals within each category.

who might be called staff. Distinctions tend to be more subtle in nature, more or less sliding across job roles in a manner dependent upon the organizer chosen. A natural question to ask next concerns differentiation in terms of the work requirement data. "Do the different job role categories, in fact, differentiate themselves in terms of the work requirements?" Once again, because of the vast number of work requirements data categories derived during the Oregon Studies, the question will be approached utilizing summarized data. Specific categories of standards, tasks, etc. will not be used. Averages will be used instead. Table 12.9 provides data which indicate the average number of outputs, standards, tasks, and enabling knowledges, skills and sensitivities identified by each individual within the related job role categories. The average number of outputs identified with each job role decreases as the table is scanned from top to bottom. The distinction between standards of the process and output variety presents an interesting analysis. As Table 12.9 shows, the Principal Investigator category reported a fairly equal number of process and output standards. The Project Director category, on the other hand, is more concerned with process related types of standards. The latter concern also holds for individuals classified within Top Level Project Manager job role category. A shift, however, takes place for the job role category First Line Supervisor, with the emphasis at this point being placed upon output standards. Reviewing the rest of the table it can be seen that this is the only job role category which has reversed the emphasis from the process standard side to the output standard side. The remainder of the data within this table can be reviewed by the reader in similar fashion.

Table 12.9 The Average number of Outputs and Work Requirements identified with individuals clustered by Job Role

Job Role	The Average[a] Number of Work Requirements						
	Outputs	Process Standards	Output Standards	Tasks	Knowledges	Skills	Sensitivities
Principal Investigator (14)	3.0	6.0	5.5	33.1	9.3	6.9	7.0
Project Director (12)	3.8	9.6	5.6	44.3	12.8	11.2	9.7
Top Level Project Manager (25)	2.2	7.6	3.4	32.6	7.8	7.4	6.1
First Line Supervisor (5)	2.0	8.0	11.0	40.2	8.6	12.2	8.4
Professional Staff Member (48)	1.9	7.7	1.3	31.2	8.4	8.6	5.6
Clerical Support Staff (1)	1.0	4.0	0.0	29.0	6.0	6.0	2.0
Technical Support Staff (4)	2.3	5.5	1.8	33.5	13.8	19.0	8.0
Advisor or Consultant (6)	0.8	4.0	0.8	8.7	3.0	3.0	1.2

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[a] The average figures were derived by dividing the raw number of outputs by the number of individuals within a job role category, as an example.

In an attempt to further clarify the data presented within Table 12.9, Table 12.10 restructures the data in terms of the job role categories to indicate the average number of work requirements indicated per output. Once again, in reviewing the process output standards columns, it is interesting to note that the individuals classified as

Table 12.10 The Average number of Work Requirements identified for the average number of Outputs identified for Categories of Job Role

Job Role	The Average[a] Number of Work Requirements per Output					
	Process Standards	Output Standards	Tasks	Knowledges	Skills	Sensitivitie
Principal Investigator (14)	2.0	1.8	11.0	3.1	2.3	2.3
Project Director (12)	2.5	1.5	11.7	3.4	2.9	2.6
Top Level Project Manager (25)	3.5	1.5	14.8	3.6	3.4	2.8
First Line Supervisor (5)	4.0	5.5	20.1	4.3	6.1	4.2
Professional Staff Member (48)	4.1	0.7	16.4	4.4	4.5	3.0
Clerical Support Staff (1)	4.0	0.0	29.0	6.0	6.0	2.0
Technical Support Staff (4)	2.4	0.8	14.6	6.0	8.3	3.5
Advisor or Consultant (6)	5.0	1.0	10.9	3.8	3.8	1.5

[a] The average figures were derived by dividing, as an example, the number of process standards identified in Table 12.9 by the number of Outputs identified within the same Table.

First Line Supervisor are the only group, in terms of the work requirements, which places heavy emphasis upon output standards. This may suggest that they were serving in the role of "quality control agent," and, in that role, having a high level of concern with processes. It is interesting to note also that individuals classified as Professional Staff Member indicated less than one output standard on the average for each of the outputs with which they were associated.

With the exception of the very narrow technical areas represented by the clerical and technical support staff there appears to be little differentiation in terms of the number of enabling knowledges, skills and sensitivities identified for each of the outputs produced by the various job roles. The data suggest that each job role relies on about the same range of knowledges, and exercises equivalent ranges of expertise for any given output. The total number of outputs which can be associated with each role is not known at this time. With a more extensive set of data it may well be that differences occur at the level of numbers of outputs attended to by each job role as well as the specific categories of knowledges, etc. associated with job roles and outputs. An examination of categories of knowledges associated with a job role at this time unfortunately could do no more than point out the low frequencies within each cell entry.

Data in each of the tables presented so far suggests that different clusterings of job roles can facilitate data analysis. From the point of view of planning a project effort it appears job roles are, in fact, not well defined and tend to slip and slide by Level, Function, Structure and Character of output. The data, then, would appear to have a significant bearing on the questions of management and organizational structures. For example, if everything done by a "manager" is defined as management and the output of other "non-management" types as production, the resultant data would appear quite different from that produced by the Oregon Studies. To build an organizational structure around a concept such as job role then, might prove to be an inadequate procedure. This possibility was alluded to any number of times by the interviewees as they indicated that the charts that represented the line and staff relationships did not factually represent the sets of functional working relationships that endured through time. It would appear from the Studies' data that organizing by job role is subject to question as an effective procedure. On the other hand it would appear that job role might be a convenient organizer around which to discuss gross categories of activity as long as clarity exists, in rather precise terms, about what individuals who are categorized within a particular job role are to produce and how each of those elements influence or fit into the overall effort. It is possible that outputs might eventually come to serve the role of organizer now served by job role if the Oregon Studies data proves valid and reliable over time.

Special Issue IV: The Utility of the Classes of Data and their Interlinkage

The purpose of the present discussion is to give perspective to the classes of data available from the Oregon Studies in terms of their utilization by trainers and practitioners in the field of educational RDD&E. Toward that end discussion of the issue is organized around (a) the substantive utility of the classes of data available as independent sets and in combination, and (b) the linking of the data sets to a program context.

Substantive Utility of the Data Sets Available

The major premise of the conceptual framework within which the Oregon Studies rests is, that people perform work within contexts to produce outputs or outcomes. Accordingly, the data produced by the Oregon Studies were collected and ordered into three broad classes or data sets, i.e., (a) context linked, (b) people linked, and (c) output linked. Figure 12.1 illustrates the nature of the interdependent relationships of these sets.[1] As illustrated, the information contained within the data sets has specific meaning to the working contexts from which it was obtained. The present discussion focuses on viewing the data as information having relevance and meaning to trainers and prospective practitioners.

Utility of the Independent Data Sets

The independent data sets provided by the Oregon Studies have a utility relative to the development of programs which runs parallel to that of mapping the domain of educational RDD&E. It has been argued that the parameters of a domain can be described in terms of (a) context (the territory), (b) people (the inhabitants), and (c) outputs (the artifacts produced). Given the knowledge base contained within each of the independent data sets of the Oregon Studies, the user may judge the adequacy of his resources and the degree to which he can attend to any or all of the variables identified within the constraints of an academic degree program or work context time line.

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[1] Figure 12.1 illustrates the functional or dependency relationships of the sets of data illustrated in Figure 4.2 of Chapter 4. An extended discussion of the data sets also found in that chapter.

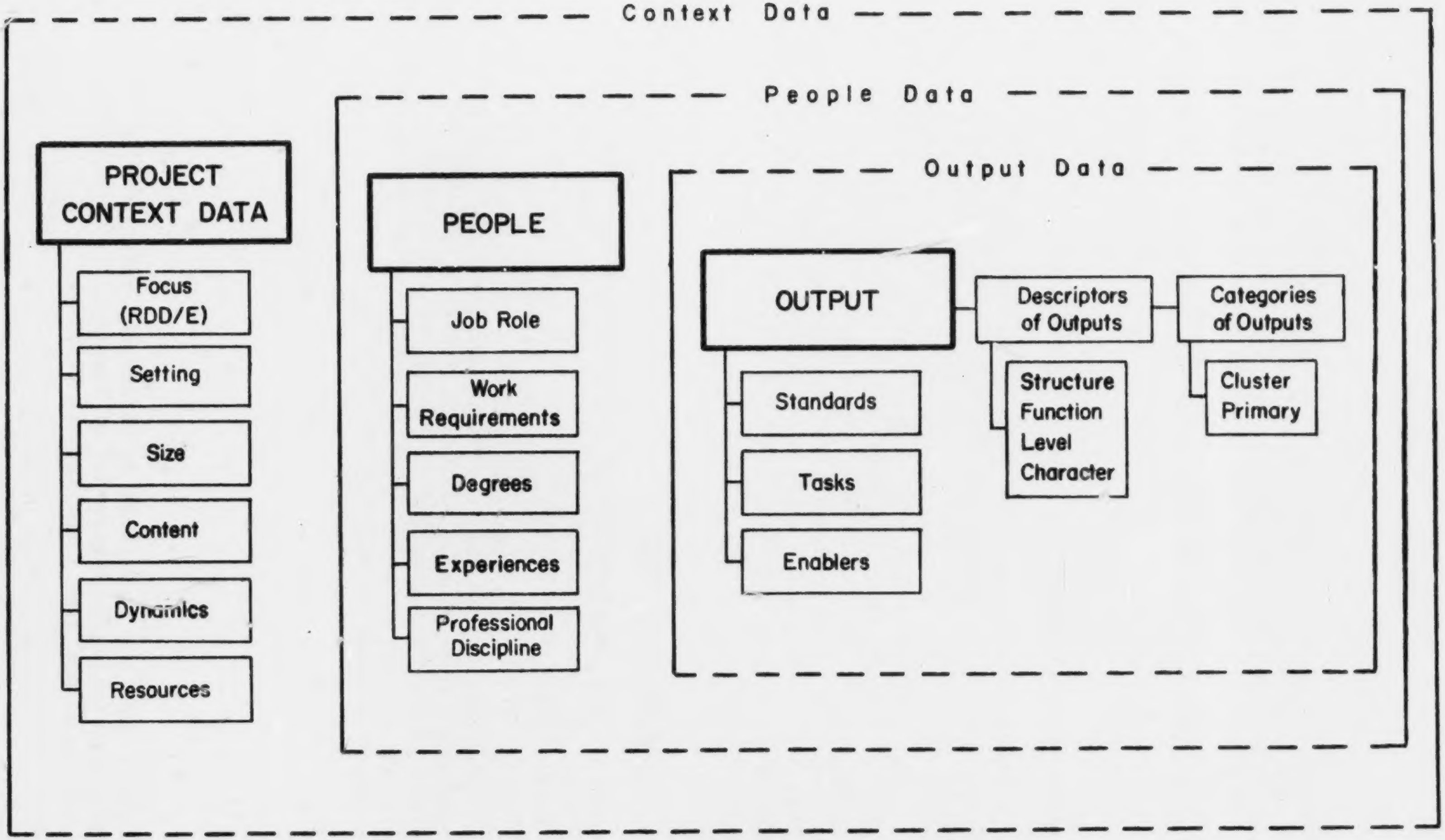

Context Data
People Data
Output Data
PROJECT CONTEXT DATA
Focus (RDD/E)
Setting
Size
Content
Dynamics
Resources
PEOPLE
Job Role
Work Requirements
Degrees
Experiences
Professional Discipline
OUTPUT
Standards
Tasks
Enablers
Descriptors of Outputs
Structure
Function
Level
Character
Categories of Outputs
Cluster
Primary

Fig. 12.1. The Nature of the Interdependent Relationships of the Data Sets

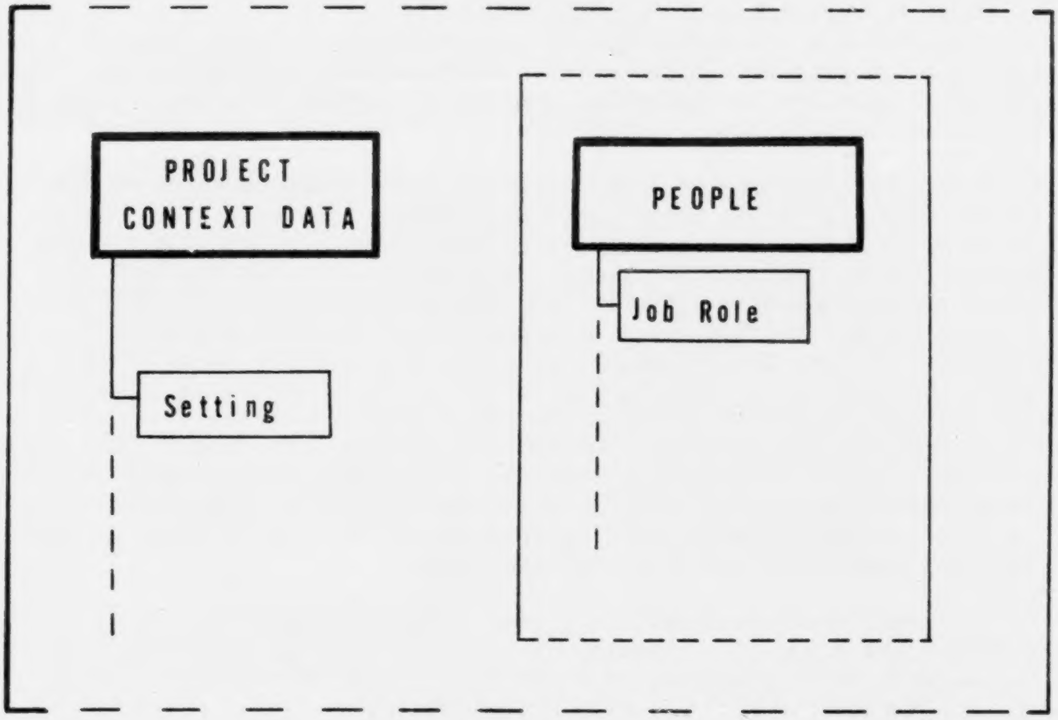
In a substantive sense, context-linked variables provide the user with information regarding the focus, setting, size, etc., of educational RDD&E. Such information can aid the user in planning a program which, for example, prepares a trainee or novice to (a) work in lab centers, colleges/universities, or in public schools, (b) to work as relatively independent agent or as integrated team member in a large organizational structure or project, (c) to work as a researcher, developer, etc. Each of these variables has potential utility for identifying such things as inservice training sites or the breadth and depth of tool skills which must be possessed by the trainee or novice. People-linked data explicate for the user knowledge of such variables as relevant backgrounds and experiences, job roles being performed, and degrees held, etc. Here the user is guided in his planning by those elements that functioning practitioners feel are important. In addition, the descriptions of those functioning practitioners may suggest to the user the need to plan or design programs which systematically introduce the trainee or novice to persons representative of those with whom he is ultimately apt to be working. Output-linked data, on the other hand, introduces the trainer or practitioner to the broad range of things considered to be relevant and important outcomes of focused work effort. The variability of these outcomes, or outputs, along with the standards and work requirements associated with their generation should surely indicate the range of resources which might be brought to bear on the program, production, management and organizational tasks.

In sum, the independent data sets permit the user to view systematically the range of variables around which training or practice might be focused. It is possbile, also, to identify those variables having obvious implications for program format decisions (e.g., classroom vs. inservice training).

Utility of the Data Sets in Combination

Independent consideration of each of the data sets provides one level of guidance to planning and conducting program activities. Given the array of data in each independent case, however, the prospective user is left to decide for himself what is important within each class of data, and to select those elements considered relevant to a specific program need. Figure 12.1 implies that the user may be systematically assisted in giving focus to his selection of elements. Such assistance is provided by combining the context, people, and output-linked data sets in various ways.

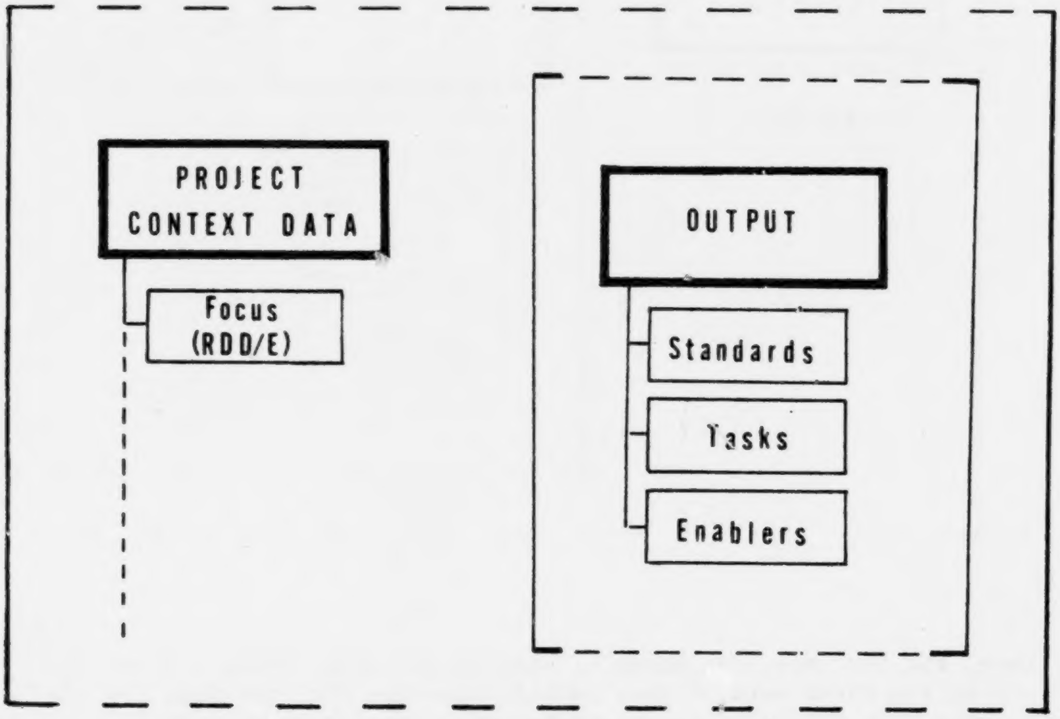
One way in which the available data may be viewed in support of a program or project design can be diagrammed as follows:



Since the nature and scope of job roles, for example, may vary according to the contexts in which they are carried out, the diagram suggests that the job roles of people be associated with the various contexts in which they occur. Thus, for a user choosing a particular focus and a particular setting in which his program may be expected to work, the range and scope of people-linked data may be more discretely defined. For example, a "manager" in a large public school will quite likely perform a different set of work activities than will a "manager" in a lab center. By the same token, a "producer" may find his role narrowly defined in a large public school context, while in a small college setting he may find that his role is broadly defined.

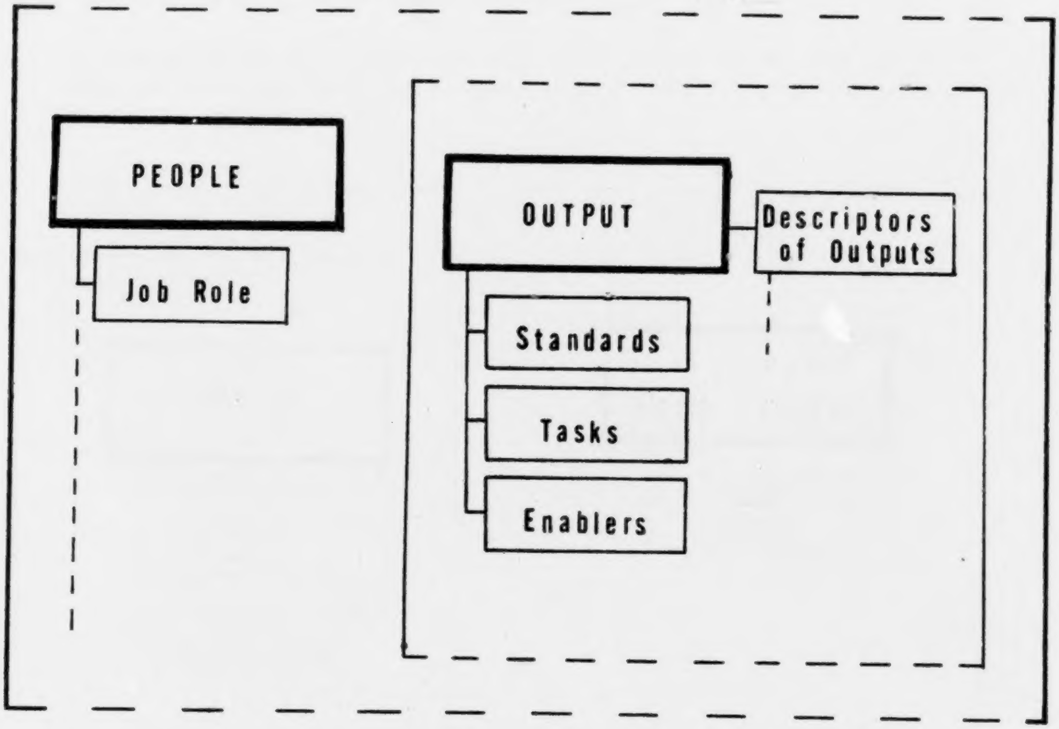
The general utility of linking Context and People data for planning purposes lies in the users ability to more specifically identify job roles within a particular context or set of contexts. Just as important as having a particular ability is knowing where and how the exercise of that ability may be relevant or dysfunctional. In some contexts it is possible that the exercise of a particular ability may be inappropriate until other abilities are first exercised. In any event, the user may specify one or more contexts which have relevance for his efforts and about which information is needed and obtain three general sets of data, (a) the job roles found in such contexts, (b) the work activities associated with those roles, and (c) the backgrounds and characteristics of people who carry out those roles. (See Figure 12.1)

Another way in which the user may view his program relative to the data available from the Oregon Studies is diagrammed as follows:



Here again, the user has the option of specifying a focus, as an example, for which he intends to train personnel. The outputs associated with those contexts may then be identified along with the work requirements linked to them. The advantage here is twofold. First, the range of outputs has been reduced by limiting the range of contexts. Second, the range of work requirements associated with a particular output has been reduced to only those having significance for producing that output within the selected context. Thus the user has available a more precise definition of the output, and the standards, enablers, and tasks associated with its generation, by virtue of the fact that it derives from a particular context.

Yet another way of viewing the data available from the Oregon Studies is in relation to people and the outputs they produce:



Here, the user may, for example, specify job roles being trained for and obtain three sets of data having relevance for training, (a) the general work requirements associated with the job roles, (b) the outputs and their characteristics associated with people in those job roles and (c) the work requirements for producing those outputs. Of special significance here is the ability to discriminate the nature of the outputs for which people in varying production and management roles have responsibility. Thus, the trainer is able to focus his training of "managers," for example, on the generation of those outputs for which a manager has unique responsibility in projects.

For the user who wishes to design a program or project that takes into account the interdependent nature of the realities encountered in world of educational RDD&E practice, all three major classes of data generated by the Oregon Studies may be considered in combination as in Figure 12.1. Simply stated, the individual following this model can specify the parameters of contexts for which he chooses to prepare people or in which he is functioning. He can choose from within those contexts the related roles which are to be provided for over time, identify the work requirements related to those roles, identify the outputs produced by such roles, and determine the enablers, tasks, and standards associated with those outputs. Implicit in this structure is the assumption that the ultimate success of a program is measured in terms of whether practitioners can fulfill the requirements of the roles they assume in various contexts by producing the outputs required of them to the standards of excellence demanded. The practitioner will find these data and their interdependencies useful in terms of predicting what may occur within a set of known factors as well as in identifying appropriate staff for his specific activities and intended outputs.

The 3 data sets of the Oregon Studies have utility not only independently but as interlinked sets. While the data do not encompass the entire field of educational RDD&E, they do provide an initial basis for making decisions. While the specific data lists are still limited, the structure which surrounds such data is already operational. It is hoped that this discussion will help the reader to determine whether the questions which he has undoubtedly generated can be dealt with by the Oregon Studies system of data management.

Table 12.11 reviews for the reader each of the data sets employed by the Oregon Studies, and the source, form, and extensiveness of that data. In addition, the table indicates where in the series of volumes reporting the Oregon Studies discussion of the data relating to each set may be found.

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TABLE 12.11

A Description of the Data Sets Employed in the Oregon Studies and Where They Can Be Found

Class of Data	Source	Form	Extensiveness	Location
Context Data				
Focus	On-site visitation	Criteria classification	4 Classifications	Volume I and IV
Setting	On-site visitation	Logical classification and written description	4 Classifications of 20 projects	Ch. 12 V. I and V. IV
Size	On-site visitation and documents	Numerical composite of funding level, duration	7 Classifications of 20 projects	Ch. 12 V. I and V. IV
Content	Documents	Written description	20 projects	Volume IV
Dynamics	On-site visitation	Written description	20 projects	Volume IV
Resources	On-site visitation	Questionnaire	8 major categories	Chapter 6, Vol. I*
People Data (134 Interviewees)				
Job Role	On-site visitation	Questionnaire ranking and written description	8 production/management roles	Chapter 6, Vol. I* and Volume IV
Work Activities	On-site visitation	Questionnaire responses	8 major clusters, 70 items	Chapter 6, Vol. I* and Volume IV
Degrees, Experiences, Characteristics, etc.	On-site visitation	Questionnaire responses	23 variables	Chapter 6, Vol. I* and Volume IV
Output Data				
Identified Outputs	On-site visitation	Lists and maps as verified by each project	962 Outputs	Chapter 7, Vol. I and Volume IV*
Primary Categories	Identified outputs	Lists of discretely different outputs	326 Categories	Ch. 7 and Appendix to Volume I*
Cluster Categories	Identified outputs	Lists generated from criteria classification	51 Categories	Ch. 7 and Appendix to Volume I*
Output Structure	On-site visitation	Criteria classification	3 Classifications	Ch. 9 and Appendix to Vol. I and Vol. IV*
Function	" "	" "	" "	" " "
Level	" "	" "	" "	" " "
Character	" "	" "	4 Classifications	" " "
Standards				
Statements	On-site visitation	Recapped lists from tapes	1[illegible]48 statements	V. IV Profile Appendices
Categories	Interview statements	Lists generated from criteria classification	2 structures and 79 categories	Ch. 8 and Appendix to Vol. I and Vol. IV*
Tasks				
Statements	On-site visitation	Recapped lists from tapes	3722 statements	V. IV Profile Appendices
Categories	Interview statements	Lists generated from criteria classification	20 clusters and 280 categories	Vol. I and Vol. IV*
Enablers				
Statements	On-site visitation	Recapped lists from tapes	2497 statements	V. IV Profile Appendices
Categories	Interview statements	Lists generated from criteria classification	3 structures and 136 categories	Ch. 8 and Appendix to Vol. I and Vol. IV*

* Asterisks indicate that additional data exist in the files for which exhaustive analyses were not made. The data files thus represent a major output of the Oregon Studies.

Chapter 13

IMPLICATIONS FOR CONCEPTUAL AND METHODOLOGICAL DEVELOPMENT

The preceding chapters of this volume have led the reader into and through the empirical maps of the domain of educational RDD&E as plotted by the Oregon Studies. From the opening challenge of Chapter 1 to the closing issue of Chapter 12, the emphasis has been on discussion of the constructs involved, the variables associated with them, and the data collected about them. In addition the reader has been repeatedly cautioned about the limits of the data and the degree to which various aspects of the data can be generalized. The purpose of the present chapter is not, therefore, to address strengths and weaknesses but rather to make explicit what appears to be needed, conceptually and methodologically, to bring further clarity to the nature of educational RDD&E and the training which supports it. The reader is forewarned, however, that understanding the following content will require basic familiarity with the content of Chapters 1-4 of this volume.

Problem Areas for Further Work

In addressing the need for further conceptual and methodological development it must be remembered that there was interaction between the methodological framework of data generation in the Oregon Studies and the conceptual framework which guided it. Thus it seems appropriate to discuss these developmental needs in terms of what kinds of information and understanding (with respect to educational RDD&E) are needed beyond what the two frameworks now offer. The needs seem to reside in, but are certainly not limited to, five problem areas; (a) the explication of "operations," (b) the resolution of "level" problems, (c) the refinement of the linkages of data, (d) the extension of the frameworks to integrate additional phenomena observed in the field, and (e) the refinement of the data generation strategy to increase its efficiency. Each of these is discussed separately.

"Operations" as a Problem Area

The basic elements which conceptually define project operations, i.e., actions, tasks, and activities, could not be discriminated within the time frame of the Studies. As a construct, operations data were to describe what it takes to produce various outputs. The elements of operations data were designed to explicate patterns associated with those efforts. This framework seems to remain sound and indeed could make a significant contribution to understanding operations at a level other than that of the nature of the work. Methodologically it is possible that inability to discriminate among the elements was due to potentially "circular" (or linear) conceptual definitions, i.e., an "action" is a unit of a "task" which is a unit of "activity," etc., which do not provide a stable reference point.

Conceptually, the first task would seem to be one of examining the output and work requirements data gathered thus far for any new insights which might emerge. From that point, two alternatives are seen: (a) redefinition of the conceptualized elements of operations such that they retain the dependency linkages but have discrete discriminators included, or (b) reconceptualizing the taxonomy used to describe operations.

"Level" as a Problem Area

The nature of the problem just described for operations is one example of a "level" problem, but it was discussed separately because of the implications for construct redefinition which seem to be involved. Other level problems, however, have a different kind of importance. The examination of outputs, for example, suffered a similar "level" problem. Conceptually, four levels of output orientation had been specified, i.e., facilitating, component, terminal, and focal. Operationally the terminal classification had to be abandoned in the absence of a sufficient base on which to establish stable decision rules. The loss of this capability hampered the capacity of the methodology to display the interdependencies of outputs at the sought-after level of detail. As a result, the rigorous testing of the nested set hypothesis regarding educational R,D,D, and E was somewhat impaired.[1] The importance of this is seen in the potentiality that such clarification holds for a disciplined examination of organizational structures when viewed from the vantage point of their outputs. The examination of output maps which order outputs on the basis of their interdependent relationships within a project may aid in the conceptualization of a taxonomy which better describes output level. From a methodological point of view, the rules for level classification would have to be revised accordingly and the relationship between the classification of an output and the development of an output map clearly delineated.

Another "level" factor relates to initial output identification. From a methodological point of view it may be possible to identify "an output" for nearly any task mentioned by an interviewee. Thus far in methodological development, however, the guidelines recommend identifying such outputs only to the extent that an informant perceives a task or set of tasks as having a discrete output. The full implication of this strategy as it relates to mapping the domain needs exhaustive study. Concretely, as a result of the strategy followed the data of the Oregon Studies may appear to vary from other studies in terms of inclusions and comprehensiveness. Cursory analysis of this phenomenon indicates that it is likely a function of differences in where a particular data element appears, for example in task data rather than output data or vice versa. The point is, there would appear to be added power in conceptualizing, and handling methodologically, the identification of the outputs of any task even though the task itself was perceived as relating to a higher order output. By discriminating between perceived outputs and task outputs an output map could be constructed which could give added dimension to the operational structure of a project.

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[1] The nested set hypothesis holds that some research, development, diffusion, and evaluation strategies are employed within each of R,D,D, and E. A complete discussion is contained in the Schalock-Sell conceptual paper in Volume III of the Oregon Studies.

Data Linkages as a Problem Area

There would appear to be two major considerations with respect to the linkages of data in the Oregon Studies. Specifically these involve (a) linkages of the Function variable and (b) linkages of enabler and task data. The Function classification has, methodologically, been applied to outputs only. While this is not necessarily at variance with the conceptual framework, it provides only limited understanding of Function as a variable within project operations. Presumably, other variables could be linked to Function as well, and a conceptual effort to identify those applications is needed. Given such applications, careful consideration would have to be given to the method by which such classifications could be reliably and validly determined.

The second set of linkages which seems desirable is between enablers and tasks. The ability to link enablers to tasks would provide the trainer with a step-by-step level of detail in producing outputs that may add to the utility of the data. It is possible, of course, to elicit that detail by interview, but the redundancy which occurs from one task to another, given the same output, may yield "convenient" response data rather than discrete data. Indeed, experience showed that interviewees tended to report previously given enablers for each task. Such redundancy became obtrusive with the result that respondents acknowledged they were beginning to give "convenient" responses. Conceptually, there needs to be a review of the gains and losses in establishing this linkage in data collection as opposed to creating it in data reduction. Methodologically, added testing of various alternatives may produce the linkage at a data collection level in such a way as to eliminate the obtrusiveness of redundancy in the eyes of the respondent.

Extension of the Framework as a Problem Area

Two immediate extensions of the framework are apparent from the data collection efforts and the data collected to date. These include a) personality characteristics relative to people and b) the acknowledgement of the changing character of an output when viewed according to its use.

Attitudes and personality characteristics viewed as essential enablers appeared in the sensitivity data collected by the Oregon Studies. From the conceptual point of view, consideration needs to be given as to the legitimacy of personality characteristics as an enabling class of data or as part of the people-specific data. On the one hand, that class of data has power when connected to outputs in describing those characteristics essential to achieving an output. On the other hand, as part of people-linked data it provides a means for more exhaustively describing the people within a context. From a methodological point of view, if personality characteristics are retained in the enablers data a new category set of data needs to be established, and the interview strategy needs to be expanded to focus on that category at the same level as was the case with sensitivities. Should such data be conceptually linked to people, another means of systematically collecting the data needs to be developed.

With regard to outputs, the nuances and technicalities involved with classifying the Character of a thing as an output of a project is difficult to manage cognitively in the absence of a construct which distinguishes the output per se from the use to be made of it (as input). For example, the decision rule is to regard a project's production of new knowledge as an instance of the output of research and, in addition, to label that output as having the Character of Knowledge. On the other hand, its use within that project (or by others) may cause it to be regarded as Information (which in output terms is an output of Evaluation). Considerable clarity could be brought to the interacting nature of RDD&E as a nested-set if the transiency of the classification given the output of each is controlled by a dual classification system. The second classification would deal with the use or intended use of the outputs. A conceptual argument for this point of view needs to be developed and the concept integrated into the framework in such a way as to show how clarity is achieved by such process. Methodologically, the same character classification labels would be used for the dual classification, but discriminators, strategies, and decision rules for identifying the uses of outputs (giving them "input" identity) would need to be established.

Data Generation Strategy as Problem Area

Reference has been made to the transportability of the methodology as a feasible, cost effective means of further data generation. Involved here are issues of economy relative to training persons to collect data by way of the methodology, the efficiency with which data can be collected and processed, and the trustworthiness of the information load contained in that data.

In present form, the methodology is reasonably operable and straightforward relative to the data collection process. Whether it be in interview or questionnaire form, it is anticipated that others may be efficiently trained to collect the data in accordance with the methodology. There is reason to believe, however, that the data reduction process remains complex and difficult, with the level of detail given in the guidelines not yet sufficiently explicated to change this condition appreciably.

Judging the efficiency of the data collection strategy as such must be referenced against short term and long term data needs. The interview strategy provides a means of controlling against idealized or "obvious response" data such as becomes a problem in interpreting questionnaire data. As long as the premium is on describing or mapping the realities which inhere in projects, there are acceptable levels of benefits to be derived from use of the more time consuming and costly interview strategy. For the short term then, including at least one more data collection effort to test methodological revisions and the stability and exhaustiveness of current data elements, the interview strategy is the more productive.

Long term data needs which focus on the probable existence of and degree of emphasis given various identified characteristics of the domain of educational RDD&E over time, however, demand a less costly methodology. Toward that end careful consideration needs to be given to the design of a survey instrument (or instruments) based on the units of analysis and elements of data prescribed by the conceptual framework and which maintains the integrity of the linkages between data sets. To the extent possible, the measurement scales used should reflect the *emphasis placed on a phenomena as opposed to the single occurrence of the phenomena*, and the concept of open-endedness of the categories should be maintained. In addition, the procedures and decision rules which identify and specify the response range expected from each individual within a surveyed context need to be established.

Conceptual and Methodological Adequacy in Perspective

The intended interactions of the conceptual and methodological thrusts of the Oregon Studies have been described and referred to throughout the present volume. In retrospect, these intended interactions have provided in large measure (and as expected), the real strength of the Studies. The conceptual framework provided a stable benchmark for the initial relating of descriptive elements of educational RDD&E to each other. As the concepts were verified or were proven to be idiosyncratic, at least in part because of the inaccessability of data, the methodology gave further shape to the framework. As a result, a conceptual framework has evolved which shows significant promise as a functional basis on which to give shape and direction to an emerging discipline. Concomitantly, a methodology has evolved which has been tested conceptually and empirically as a means of identifying parameters of the domain to be served by such a discipline. To the extent that existing practices in the projects described to date reflect reasonably the practices likely to continue for the present and near furture, the data generated by the application of the methodology represents the most comprehensive and potentially useful description of educational RDD&E activities available today. Further development and interpretive reporting can support diffusion of the results of the Oregon Studies to the field, but in the final analysis their utility will be measured in terms of the responsive use made by the field of the constructs, of the information base contained within them, and of the degree to which the extension of data in depth is demanded. It is hoped that the contents of this chapter build on the integrity of efforts to collect data and lay a relevant and important foundation for perceiving critical tasks ahead.

Chapter 14

IMPLICATIONS FOR TRAINING: HIGHLIGHTS OF THE DATA

It will be recalled that while the Oregon Studies were designed to serve a basic science function they were initiated to serve the needs of training. As such they were among a number of research and development efforts that in combination were designed to reshape the nature of training programs in educational RDD&E. The present chapter is the first of two chapters in the present volume that attend directly to the implications of the Studies for the design of training programs.[1]

Since a primary aim of the effort to reshape training in educational RDD&E was to create a "data dependent" model of training, and since the Oregon Studies were designed to contribute to the data base needed to operate such a model, the two implications chapters that have been prepared are data oriented. The present chapter represents an attempt to pull together and highlight data, from this point of view, that appear in various forms and places throughout the report of the Studies. Two different kinds of data have been highlighted: (a) the data reported in Chapters 6 through 12 of the present volume; and (b) the data reported in each case profile in the form of "implications for training" that emerged from informal discussions and observations while in the field. The first of these sets has been organized around a series of questions that might be asked by a person who is contemplating the field of educational RDD&E as a place to work. The second has been summarized in simple narrative form. The chapter closes with a discussion of the way in which the various Volumes in the series of Volumes reporting the Oregon Studies might be used in support of training efforts.

Cross-Project Analyses

In order to highlight data from the Oregon Studies a perspective was chosen that would allow for a relatively uncomplicated, straightforward discussion of what the data might mean to a select reader. In service of this aim the following paragraphs are directed toward answering a set of questions generated to reflect the concerns of a novice entering the field of RDD&E. The same approach could be used to serve other points of view such as that of the trainer, the practitioner, or

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[1] Obviously, the full range of implications of the Studies for training cannot be dealt with in the space of two chapters. Nor can they be dealt with in service to all potential consumer groups. The limitations of the report of the Studies in this regard, and what can be done to overcome these limitations, are dealt with more fully in Chapter 16.

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Question 1. What kinds of people will I work with in educational RDD&E? (Ch 6)

One of the striking characteristics of educational RDD&E personnel is the fact that most of them are male. Two out of every three people working in the general field are men. The lone exception to this general trend appears to be in diffusion. In that area, at least for the five diffusion projects studied, the majority of personnel are women. Diffusion personnel also tend to be older. Those who seek to work with younger staffs should look to the area of research. Those who value experience most highly will find personnel in the development projects to be older and more widely experienced than in any of the other areas.

Question 2. What kind of credentials do I need to work in the field? (Ch 6)

All of the people who work in educational RDD&E, according to the Oregon Studies sample, hold at least a bachelors degree. Far greater than half hold either a masters or doctorate. In research projects and evaluation projects almost half the people surveyed held doctorates. While people in the field indicated that the work they did often did not require the possession of these degrees, they also indicated that the political realities were such that they were a needed credential. Most of the major job roles in the field, such as project investigator or project director, were held by those with the highest degrees. These same people were generally the ones who published articles and papers. Not everyone in educational RDD&E publishes. Over half the people surveyed had no publications. On the other hand, however, some people had more than 16 publications.

Question 3. How much money will I make? (Ch 6)

Some people in development and diffusion projects earn more than $29,000 a year. Graduate students working as research assistants and part-time workers make less than $5000 a year. In general, most of the people earn between $12,000 and $17,000 a year. The amount of money earned depends on a number of factors; primarily experience, training, and academic degrees.

Question 4. Do I have to belong to any particular professional organizations? (Ch 6)

No. Most of the personnel in the projects surveyed belonged to no professional associations. Those who did belong were members of AERA or NEA primarily, although a number of other associations were mentioned.

Question 5. What should I get a degree in? (Ch 6)

Since at least a Bachelors degree is in apparent prerequisite to employment, it seems logical to assume that some kind of major or minor area of study would also be important. In the real world, however, this does not appear to be the case. Members of RDD&E staffs majored in a wide variety of subjects. The largest proportion claimed majors in or related to Education or Psychology, but almost any area of specialization seems to be acceptable. The important thing seems to be the degree.

Question 6. What kind of experience do I need? (Ch 6)

Many people working in educational RDD&E have had no previous experience. Experience in teaching at various levels and in working in education generally is fairly common, but even those working in the field don't consider experience in RDD&E essential to much of the work done.

Question 7. What kinds of resources will I need or be using? (Ch 6)

The most commonly used support service in the field of educational RDD&E generally is typing. Computer use, library, audio visual equipment and the like are other services provided by support staff. Personnel in projects use such things as desk calculators, dictating equipment, keypunch machines and other similar kinds of equipment.

Question 8. What will I get paid for? (Ch 7)

People working in educational RDD&E are responsible for producing a variety of products, causing certain events to take place, and creating conditions that help to make things happen. All of these things combined represent the outputs of work within the context of educational RDD&E. Most of the work is devoted to the production of products. The most common products produced are written reports of various kinds, project schedules and timelines, data about a variety of things, and a wide range of instruments and tools. The kind of products produced depends upon the focus of the project producing it (research, development, etc.) and upon the purpose of the particular project within that focus. When personnel are not engaged in producing products they are usually engaged in the execution of events, for example, recruiting staff, collecting and analyzing data, or adapting materials, or engaged in the creation of conditions. Examples of conditions that frequently have to be created in the world of RDD&E are good work atmospheres and cooperative relationships.

The outputs of work within educational RDD&E generally play different roles in different projects. Sometimes a given product, event, or condition is the main, or focal, output that a project is attempting to produce, sometimes it is needed as a component of the focal output, and sometimes it is used only to help or facilitate the production of other outputs. Some outputs also are required for the purpose of setting policy for a project, others for managing the project, and still others for carrying out production. The important thing to realize is that all work in educational RDD&E is directed toward the production of specified outputs that have specified standards, and that successful work results in the production of outputs that meet those standards.

Question 9. What kind of work will I have to do? (Ch 8)

For any given output, a staff member or group of staff members have to take advantage of the knowledges, skills, and sensitivities they possess to perform the tasks that are required to produce the output to the standards set for it. Since a number of tasks have to be performed in the production of most outputs, personnel have to possess or acquire a wide variety of enablers (knowledges, skills, and sensitivities) in order to perform their work satisfactorily. In the performance of work it is important to realize that standards are set for how work is done as well as for the outputs of work. Some of the specific kinds of work educational RDD&E personnel perform includes developing measures, creating cooperative relationships between agencies and people, working with schools, parents, and communities, thoroughly testing new ideas or innovations and, almost always, writing reports about the work that was done.

Question 10. What do I need to know or be able to do to carry out educational RDD&E tasks? (Ch 8)

What a staff member has to know depends primarily upon what outputs he has to produce. There are some knowledges that appear to be needed more in some kinds of projects than in others. Almost all projects produce outputs that require a knowledge about what a project is attempting to do, how the project is going to do it, and for or with whom it is to be done. Most also produce outputs that require a knowledge of educational RDD&E related subjects and technical or discipline related subjects.

The most commonly needed skill in educational RDD&E is the ability to write clearly, consisely, and understandably. Outputs produced in all project areas call for this skill to one degree or another. Other skills needed by educational RDD&E personnel involve helping people work together, making sense out of the various elements that constitute problems, planning, and using self discipline. In addition, research personnel rely heavily upon data handling skills, diffusion personnel rely heavily upon the ability to explain and justify what they're doing, and evaluation personnel have to be good at analytical problem solving. Many other skills are also needed but those mentioned are the ones most frequently called upon.

People working in educational RDD&E projects have to be sensitive to their own and others' capabilities and limitations, and they need to be aware of and sensitive to existing value systems and the needs they and others have. They also need to be sensitive to the way the target audience of their work feels about the work, and about things in general. These sensitivities are the ones most commonly mentioned by people in the field. Many other sensitivities are needed as well, however. For example, in evaluation projects personnel need to be aware of the limitations of data and of the analyses that can be made with data.

Question 11. What kinds of tasks will I need to perform? (Ch 8)

There are many tasks that are performed in the field of educational RDD&E. The kinds of tasks a given staff member will have to perform depends on the output he is trying to produce, but there are some tasks that are required often enough that nearly everyone in the field will have to do them at one time or another. One such task is the preparation and assembling of the component pieces and parts of the contracted-for outputs, for example, fitting together various papers into a final report. Other tasks include making modifications that are needed in outputs, reviewing materials, negotiating contracts, getting people or agencies to cooperate in producing outputs, constructing and administering tests, questionnaires and other data instruments, and communicating with colleagues or others to explain or critique or specify what has been or needs to be done.

Question 12. On what basis will my work be judged? (Ch 8)

Standards of quality are applied to both outputs and the processes involved in producing them. For any output that is to be produced there are specific standards that have to be met before the output is considered acceptable. The standards most commonly applied to outputs in the field of educational RDD&E demand that the goal established for an output be met, that other people in the project accept the output, that it is complete, that it gets accepted by whoever is supposed to use it, and that it is useful or valuable. Depending on what kind of project is involved, other standards for outputs frequently come into play. Personal satisfaction with an output is a frequently mentioned standard in research, as is a concern that the output functions as planned. Evaluation projects often use standards associated with being sure that outputs were designed correctly and were produced without error.

In terms of the processes involved in producing outputs, common standards relate to whether the effort expended resulted in a favorable impact, whether people outside the project appeared enthusiastic about the work being done, whether deadlines were met, whether the project budget was lived within, and whether personnel met the criteria used for employment. Other processs standards mentioned frequently in various projects included the researcher's concern with cooperation among personnel, producing an acceptable level of output, and getting things done that are supposed to get done. Personnel in development projects, along with the standards mentioned, frequently show concern that no deficiencies show up in working on an output. Personnel in diffusion projects expect that people can see what needs to be done and do it.

Question 13. What will my job be? (Ch 6 and Profiles)

The beginning staff member, with no experience and a bachelors degree, will most likely be considered simply a member of the professional staff and hold the title of Instructor, Research Assistant or something similar, depending upon the agency in which he works. There are a number of factors such as age, experience, degree, publications, "connections" and the like, not to mention demonstrated ability, that determine the role of a particular staff member. Interestingly, when asked about job roles, as many regular project staff members identified themselves as holding a management level role as they did a production level role. There are apparently as many "bosses" in the field as there are workers. This unique role relationship is not as simple as it may appear, however, for the actual work done by managers is not greatly different from that done by other staff members. Both groups overlap in the performance of management and production work efforts.

Question 14. What do I need to know about the outputs of work effort? (Ch 9)

Any given output assumes its own particular identity within the context in which it is produced. A guide or manual might be the focal output of, say, a development project and be only a facilitating output in an evaluation project. In one case it might serve the function of setting policy, while in another it might serve a management function. It simply depends. As a general guide it can be said that most outputs serve a management function and are used to facilitate other outputs. Very few products, even fewer events and yet fewer conditions are the focal outputs of any given project. Products and events serve mainly management and production functions, while conditions are mostly related to management functions.

Each output produced has its own special character. Some outputs represent knowledge, some are new or revised technologies, some provide information, and some are instances of implementation. The vast majority of all outputs produced in educational RDD&E, however, regardless of the focus of the projects involved, assume the character of a technology. As might be expected research projects produce a high percentage of knowledge outputs, development projects produce a high percentage of technological outputs, diffusion produces a high percentage of implementation outputs, and evaluation produces a high percentage of information outputs. Each project focus, however, appears to produce a range of outputs inclusive of most of these characteristics.

Again the importance of an output depends entirely upon the context in which it is produced. The function an output serves, the level it assumes (focal, component, facilitating) and even its character are influenced by the setting within which it is produced and the purposes that a project is attempting to serve.

Question 15. How can I be trained to work within the context of educational RDD&E? (Ch 15)

At this time most universities offer courses specifically related to educational RDD&E topics. The most important training seems to be, according to those in the field, on-the-job experience. From the data gathered by the Oregon Studies, and the thinking of people who are involved in the field, new ideas are emerging with respect to training. These are summarized in Chapter 15, and, to some extent, in the section that follows.

Highlights of the Data that Emerged from Case Profile Analyses

The last chapter of each profile discusses training implications that emerged from the study of each project. These implications were obtained at the site from questionnaires and interviews, and from the overall impressions gained by the visiting data collection team. For purposes of the present chapter these data have been summarized in narrative form.

As might be expected virtually all the chapters on implications for training (18 out of 20) mentioned the need for specific training in research design and methodology, statistics, project management, systems, computer usage and the like. In six of the 20 sites studied technical subjects were assigned the highest priority for training. Interestingly, however, a disclaimer was often entered to the effect that while technical training was necessary, it was not sufficient. Eight of the projects made specific mention of the fact that training in technical skills was not enough to assure success in educational RDD&E activities. The consensus of those comments was that a sensitivity to the context in which the educational RDD&E activity occurred, and an ability to use technical competencies with skill and tact, were at least as important, if not more so, than having the skills in the first place.

At 14 of the 20 sites direct reference was made to the need for on-the-job or on-site experience. Many commented that this experience was vital. Whenever on-the-job training was mentioned, it was almost invariably emphasized as being a high priority need. Of the 14 sites making reference to this need, 9 gave it first or second priority among the needs mentioned. Also, when on-the-job training was mentioned, it was often with the suggestion that college preparation should include this element, and that without it preparation for jobs in educational RDD&E would be severely limited. Two sites made specific suggestions to the effect that course work and on-the-job experience should occur concurrently in training programs. At a number of sites interviewees recommended on-the-job experience during training as a means for applying and testing the theories taught in technical and academic subjects. It was felt that while technical-academic training was essential, on-site experience was necessary if the student was to understand fully the nature of what was learned in course work. It also seemed clear that trainers were being told that the work of the practitioner was already complicated enough without having to teach newly trained personnel the basic elements of real-world "etiquette", and that trainers must share this burden.

Of the technical skills mentioned the one that was most often emphasized was writing. Nine of the 20 sites indicated that writing was an essential skill in the performance of their work. While writing was almost invariably considered useful, and often essential, few respondents had suggestions as to how skills in writing could or should be acquired. The concerns most often expressed with respect to this skill were that writers be able to communicate clearly to a wide variety of audiences and they they avoid the use of jargon or "educationese."

A need often expressed by the sites visited was that of a staff member being able to work as part of a team. Seven of the sites visited made specific reference to this need, and one listed it as being of the highest priority. Those citing this need commented on the fact that most educational RDD&E activities are carried on by groups rather than by individuals, and that for that reason the ability to work within a team became a significant skill to have. The suggestion was made that dissertations be done as a team rather than by individuals so that those participating could master a specific area of specialization (i.e., measurement, statistics, design, etc.) and at the same time learn to work as part of a group attempting to achieve a specific goal. Associated with the notion of the need for teamwork were comments relative to staff being able to communicate effectively with each other, being sensitive to the needs of others, and being able to put the right people in the right "slots."

A set of comments frequently obtained related to the importance of a staff understanding and being committed to a common goal or objective. This type of comment was prominent in seven of the 20 sites. In each case those mentioning this "goal orientation" indicated that it was the focal point around which all other considerations revolved. It was generally felt that placement of staff, use of skills, budgeting, timelines and other activities were a function of the end state being sought. It was also felt that technical skills, previous experience, and degrees held were of little importance in the absence of a commonly held, mutually desired goal among staff. In terms of training these comments may seem distant if not irrelevant, but in the context of the frequently cited need for on-the-job experience it begins to make sense. In effect it appears that these people are saying "let's train people on-the-job, and let's make clear the goals we're trying to achieve so that we can work in this realm." A related comment frequently made was that people in the field "need to feel that what they are doing is worthwhile."

The only other comments made with any degree of frequency in the profiles were made with respect to prior experience. In some cases the degree of previous experience in the field under investigation or in related fields was the sole criterion for employment. Ten of the twenty sites visited mentioned experience in educational RDD&E, or in related work, as one of the primary sources of training for work on the project under consideration. Five of the sites visited recommended experience in the same kind of work as that being carried out as requisite to the job to be done, while seven listed work in related fields as important.

A number of other comments, while mentioned by only one or two sites, seem worthy of consideration. The lack of reality in training was criticized strongly at one site. The notion of learning about educational RDD&E within "four walls" was felt to be inadequate to the needs of the "real world." This ties in with the frequently mentioned need for on-the-job training. Mentioned at least twice was the fact that many people working on educational RDD&E projects had their time divided between projects. This kind of staffing pattern, which is not uncommon for educational RDD&E work, has implications for the latitude and flexibility of training needed by people intending to work in the field.

Lack of adequate training was mentioned for several specific areas including management, finding resources, using consultants, and proposal writing.

A final note must be added with regard to the matter of academic degrees. Surprisingly, in contrast to the data reported in the previous section of the chapter, degrees were rarely mentioned in connection with the necessary requisites for jobs in educational RDD&E. In fact the comment was made on at least two sites that degrees were irrelevant to the work assignments given and the tasks to be performed. Often comments with respect to the need for degrees conflicted. Some who held B.A.'s felt that Masters or Doctorates were needed for the work they were doing, while others with Doctorates felt that their work could have been done by someone with a B.A. Perhaps the best summary statements with regard to degrees is a quote from a respondent who said "the Doctorate is totally irrelevant to the work that needs to be done, but it is essential for political reasons." What this means apparently is that the possession of higher level degrees, regardless of the competence of the holder, has an influence on the people with whom educational RDD&E personnel must work. Degrees appear to be the most quickly accepted credentials that a prospective practitioner can possess.

Some Suggested Uses of the Volumes Reporting the Oregon Studies

Previous sections of this chapter have addressed implications for training that arise from the data presented in Volume I of the Oregon Studies, and from Chapter 6 of the profiles contained in Volume IV. This section will address the question of the utilization of the other volumes of the Studies, Volume II, III, and V, and the utilization of the profiles as a whole in the design and operation of a training program for the preparation of personnel to work in RDD&E.

Volume II: The Literature of RDD&E

One of the most pressing concerns of the novice upon introduction to a new field of study is his need to obtain some grasp of the nature and parameters of the field. In terms of the realm of educational RDD&E, the beginner's first concerns might revolve around such questions as: "What does the field include?", "What defines the context of RDD&E?", and "Who are the people associated with present thinking in the area?".

Several possible uses of Volume II exist when considering it as a training resource.

1. As an introduction to the field.

Prospective professionals who have made the choice to enter the fields of research, development, diffusion or evaluation in education could be introduced to some or all of the papers included in the volume as a first exposure to the nature of the career that they have chosen. In reading through the volume they could focus on a specific area of interest, e.g., research or development, and gain a sense of the issues and concerns that seem to be central to those areas, or they could survey the entire set of readings to gain a sense of the interrelatedness of the various areas within the domain.

2. As a preliminary source for exploration in the field.

Each of the areas, research, development, diffusion, and evaluation, is dealt with as an individual topic in some of the articles in the volume. Other articles deal with various combinations of areas. The beginning professional who has selected a particular area of concern for further investigation would do well to seek those articles in the volume which relate to his area of concern and study them carefully. This approach would not only provide him with a relatively compact and well organized beginning point in his search, but would lead to numerous other sources through the references provided for each article.

3. As a supplement to technical professional courses.

The two parts of the volume provide excellent resource materials for any number of courses in professional curricula related to the arena of educational RDD&E. Both the design and the content of the volume make it a convenient resource for use in a wide range of course offerings.

4. As a source of materials for symposia.

At an advanced level students or practitioners of educational RDD&E can find in the volume numerous articles that merit discussion and debate. Using a specific subject, or a combination of articles on a "theme", any number of possibilities exist for the advancement of conceptual and philosophical thinking within the field.

5. As a reference manual for on-the-job experience.

The practitioner of educational RDD&E, whether he be experienced or novice, would find Volume II a useful tool as he undertakes his own investigations in the field. Articles related to his sphere of activity could serve as a check against his own work experience, and his experience could help him to more fully understand that which is being presented by the author. The blend of his own experience and his reading of the literature should serve to enhance his understanding of the field and his ability to contribute to it productively.

These suggestions are of course quite general but they do serve to point up a number of potential uses of the volume. The reader, from his own perspective, is encouraged to find the uses that best fit the needs and purposes he seeks to achieve.

Volume III: Conceptual Frameworks.

Volume III contains a set of four papers prepared specifically for the Oregon Studies which attempt to "clarify and firm the conceptual base that underlies educational research, development, diffusion, and evaluation." The volume represents some of the most advanced and deliberate thinking about the field in general that has as yet been done. A careful reading of the papers makes evident the fact that there is as yet no unanimously held nor commonly accepted definition for the field, nor for the specific areas contained within it. This has interesting and significant implications for the training of prospective educational RDD&E personnel.

In "established" disciplines the existence of a set of accepted concepts, definitions, decision rules, rules of evidence and the like are taken for granted. Because of the relative youth of educational RDD&E as an area of study these elements are by no means clearly in evidence. For the prospective educational RDD&E worker this fact is of importance, for if he is to be trained, to what view of the discipline will he be exposed, and what concepts and whose definitions should he accept?

The papers contained in Volume III can serve a useful function in helping the educational RDD&E trainee come to grips with such issues, though they in no way provide easy answers. They are characterized by differences more than they are by similarities. Taken together, however, they provide a perspective of the domain as a whole, and of many of the critical issues within it. Using these papers as a base the prospective trainee, and the trainer as well, can begin to seek his own conceptual frame and definitions.

Volume IV: The Case Profiles

By treating each of the 20 case profiles as a reliable description of "what life is like" within the context of an ongoing educational RDD&E project, the profiles as a set could serve a valuable training function. They illustrate the nature of the outputs that are likely to be found within projects, the standards held for those outputs, the work required to produce them, and the knowledges, skills and sensitivities drawn upon in carrying out that work. They illustrate how the various outputs of work effort link together, the functions they serve, and the character they assume. The profiles also portray the institutional, political and intellectual contexts within which all of the above rest, the organization of people and resources to carry out the work required, and the "dynamics" that accompany the ever changing mix of all the elements that constitute that which is called a project.

Because the projects studied were selected so as to sample as broadly as possible the range of activities found within the domain, the profiles provide an excellent introduction to the various kinds of activity likely to be found here. Research, development, diffusion and evaluation projects have been profiled; small, middle sized and large projects have been profiled; and projects in federally supported laboratories and R & D centers, privately supported R & D centers, colleges and universities, and school and state departments have been profiled. Taken individually and/or as a whole, the case profiles presented in Volume IV constitute the most detailed descriptions of ongoing educational RDD&E activities available, and as such they should serve an invaluable function in introducing students to the field, assisting staff who have just entered the field, or assisting project directors who need to prepare experienced or inexperienced staff to carry out a particular kind of project.

Volume V: The Methodology of the Oregon Studies

Volume V of the Oregon Studies describes in detail the methodology used in gathering and reporting the data collected in the Oregon Studies. As such it represents a major effort at organizing tools and techniques from the field of educational RDD&E to describe that field. From the standpoint of training it serves as a model, however adequate, of one form of output resulting from a major educational RDD&E effort.

The methodology of the Oregon Studies can be used for training in a number of ways. Three are suggested: as an illustrative methodology, as a tool for use in replication studies, and as a model from which new methodologies can be derived.

1. As an illustrative methodology.

The methodology described in Volume V is but one of a number of possible methodologies that could have been adopted for the purposes of the project. To the interested student it can serve as an example of the process by which a methodology is arrived at, and the decisions that are involved in its application. One of the advantages of using the methodology for purposes of training is the fact that the data that result from its application are data that are of substantive value to the trainee.

Given the methodology, and the data that derive from its applications, the student of educational RDD&E can make critical analyses with respect to the logic of the methodology itself, the facility with which it has been applied, and the productiveness and utility of the results obtained. Of further use to the student is a study of the concepts or language reflected in the methodology. Because of the uniqueness of the approach used, a language system had to be developed to describe both the methodology and the results. The language developed provides a fertile base for analysis and debate on the part of both prospective and practicing personnel in the field.

2. As a basis for replication studies.

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One of the early and valued experiences of most students of educational RDD&E is the replication of previously conducted studies. The methodology of the Oregon Studies is ideally suited for use in replicating small or large parts of the parent study. The results obtained from such replications would serve as a valuable check on the data presented in the present volume, as well as a valuable learning experience.

3. As a model for the derivation of new methodologies.

A difficult task for any educational RDD&E practitioner, but especially so for the novice, is the development of a methodology that reflects new concepts or demands new approaches to measurement. Yet, if a science is to progress, new methodologies must always be developed. The precision and comprehensiveness of the Oregon Studies methodology could well serve as a model for what the development of a methodology entails, and what its presentation requires so that others can use it reliably. Though Volume V of the Oregon Studies is a relatively detailed document, and is complex reading in places, the nature of the information it holds makes it a significant document for students of educational RDD&E to come to know. The beginner in the area of educational RDD&E would be well advised to have access to Volume V of the Oregon Studies as a reference when methodological issues arise.

Chapter 15

IMPLICATIONS FOR TRAINING: DATA DEPENDENCY AND COMPETENCE

The ultimate measure of the success of a training program is the degree to which its "graduates" demonstrate competence in their assumption of work responsibilities. It is likely that very little disagreement would be found, either among trainers or practitioners, concerning the desirability of the achievement of competence as an end goal for trainees. What is likely to result in disagreement is the manner in which competence is defined and the process of training by which it is achieved.

The purpose of this chapter is to address the issue of competence from the standpoint of training. This falls in line with the charge that the Oregon Studies identify the competencies needed by practitioners in the field of educational RDD&E. Two sections are offered, the first dealing with an operational definition of competence and the second with a training model based on that definition.

A Focus for Defining Competence

The definition of the word competence includes such synonymous terms as capability, skill, fitness, etc., without reference to the "something" in which one is to be capable, skilled, or fit. In order to understand and make use of the concept of competence, then, this something, this context, for extending its definition must be identified. Almost any context suffices as long as some information is available which gives substance to a capability statement, the degree of substance is dictated by the amount and specificity of that information. Thus, the initial problem is one of specifying a context in such a way that substantive meaning is brought to the definition of competence.

Familiar contexts in which definitions of competence occur include discipline, job role, enablers (e.g., knowledge), etc. Each of these may have utility in substantively defining competence depending upon the amount and level of specificity of the information one has about them. Given a definition of competence within one of these contexts, a second problem is raised. This problem is concerned with the practicality of training in the competence: is so much involved in the definition that training cannot be accomplished in a reasonable time frame? Or is so little involved that the meaning of the competence is lost relative to the larger scheme of things to which it is designed to contribute? Consideration of the reasonableness of utilizing selected contexts for defining competence in educational RDD&E appears in the following sections.

Competence and the Discipline of Educational RDD&E

The first context mentioned in connection with defining competence was the "discipline." A question that could be asked is, "How adequate is the concept of "discipline" to serve as the basis for competency based training?" The data from the Oregon Studies provide information useful in responding to that question.

Traditional training programs exist to prepare people to work in many disciplines. Colleges and universities offer programs in Psychology, History, Art, and Chemistry, for example, so why not educational RDD&E? Educational RDD&E, like History, Art, Chemistry and Psychology is composed of an almost limitless number of elements, each of which encompasses enough "Knowledge" to demand a lifetime of study in and of itself. As the data in Chapter 6 of this volume indicate, personnel actually working in the field of educational RDD&E received training in a variety of "disciplines" including, but not limited to, education, psychology, and, peculiarly, engineering. Apparently, if these data are to be given their due, educational RDD&E contains within it content associated with a wide range of disciplines. In order to use a discipline of Educational RDD&E as a context for defining competence it becomes necessary to conduct work aimed at identifying the common element within the associated disciplines which bring them together. It is also necessary to identify those areas which make the associated disciplines mutually exclusive. Furthermore, the finding that multiple disciplines appear within educational RDD&E leads to the realization that even efforts to discriminate separate "disciplines" of R, D, D, and E would be extremely difficult. Thus, the enormity of the task in isolating these interacting variables in order to define a discipline of Educational RDD&E in the first place, is such that it is not a practical context in which to define competence in a manner relevant to training.

Competence and Job Role

The concept of job role appears frequently as an organizer for training programs. It is possible to find programs which train people to be teachers, mechanics, leatherworkers, psychiatrists and any number of other job roles. In several previous chapters within this volume, most notably Chapter 12, the concept of job role was discussed in connection with the data gathering efforts of the Oregon Studies. The conclusion presented in those discussions has relevance to the use of job role as a focus for competency based training, i.e., in educational RDD&E the actual work assumed by personnel holding the same or similar job role titles varied dramatically both within and across projects. This "slipperiness" in stability associated with job role identification in educational RDD&E has precluded, to date, the ability to determine those elements which discriminate the similarities and differences among various job roles. Such discrimination is a requisite to providing a definition of job role suitable for giving stable substance to the definition of competence in it. Until such time that job analysis efforts prove fruitful in stabilizing job roles within educational RDD&E, risks are inherent in their use as a context for defining competence at a level suitable for training.

Competence and Enablers

Many training programs contain elements focused on the acquisition of the knowledges, skills and sensitivities considered essential to the execution of job related tasks. Course titles beginning with "Fundamentals of ..." or "Principles of ..." represent examples of training efforts at this level. Basic to the development of a training program focused at this level are two conditions: 1) the enablers associated with work performance are finite and known; and 2) the enablers to be trained toward have general utility throughout the discipline.

The data on enablers contained in Chapter 8 of this volume give an indication of the degree to which the two conditions are met. The data on knowledges, skills and sensitivities actually required by RDD&E personnel in the performance of their work responsibilities indicated a wide range and limited commonality of enablers across the discipline. In short the absolute number of enablers required of personnel in educational RDD&E combined with the dispersion of those enablers across the discipline leaves one without any readily apparent set of organizers by which to cluster them. Furthermore, the discussion of the data emerging from case profile analyses in Chapter 14 points up the inadequacy of "four-wall" possession of enablers when one is faced with operating in a line production activity for the first time. Thus, caution is suggested in the use of enablers as a focus for defining competence.

Competence and Outputs

As has been demonstrated, the use of the discipline, job roles, or enablers as contexts for building competency based training programs, each have risks likely to promote less than desirable results. It is likely that any context chosen would have a number of drawbacks. The experience of the Oregon Studies staff has, however, led to the selection of outputs as the unit of analysis for data collection. It is felt that, in the domain of educational RDD&E, the same context can be used as a basis for developing training programs geared toward competence.

The feature of outputs which makes them a unique and desirable base for building training programs is their stability (see the Schalock-Sell conceptual paper in Volume III of the Oregon Studies). While the discipline itself takes on the hue of whatever perspective the observer brings to it due to the many elements it contains, while job roles tend to slide and shift, and while enablers are virtually infinite in the absence of organizers which cluster them, outputs tend to remain stable and predictable regardless of where they appear. Granted that the kinds of outputs produced by different projects tend to vary, a given output (e.g., a report or contract) can be identified as such irrespective of the project in which it is produced. A contract is a contract whether it is produced in a research project by a top level manager or an evaluation project by a research assistant.

The use of outputs as the basis for training offers a number of advantages besides stability.

1. They can be linked to all other dimensions of the domain, such as -
    a) context
    b) personnel (job role)

c) other outputs
d) work requirements.

2. They provide both the focus of training and the basis for evaluation (i.e., output and process standards).

3. They are generalizable, i.e., personnel producing a specific output in a specific setting are likely to find that same output or a similar one being produced in other settings.

4. Failure to successfully produce an output can be "traced" back to the tasks or enablers involved in its production.

5. There are a number of dimensions by which outputs can be analyzed (i.e., structure, level, character, focus) which can lead to a fuller understanding of the context (discipline, focus, project) in which they reside.

If outputs are selected as the focus for building training programs, a definition of competence becomes relatively easy to generate and program design can be readily developed. The following definition of competence uses output as the central organizer:

COMPETENCE

> The exercise of relevant enablers within a context in the performance of tasks designed to produce desired outputs having verifiable standards of excellence.

As can be noted by the perceptive reader this definition, while it centers around outputs, refers to almost all the data sets included for analysis in the Oregon Studies. In essence this means that it is possible to gather and/or assemble data around any aspect of a training program based on this definition of competence.

A Training Model Based on an Output Oriented Definition of Competence

If outputs are used as the level of analysis and focus of a competency based training program, the following steps in the development of the program are required or implied.

1. The context toward which training is aimed must be identified.

2. The outputs desired within the identified context must be determined.

3. The standards, both process and output, for the outputs selected must be established.

4. The expectations of and for individual trainees must be

determined on the basis of the context, outputs, and standards identified.

In an operational training program it might be expected that the trainer would be responsible for identifying one or a number of contexts to serve as the source of program inputs in terms of outputs and standards. Given these inputs the trainer could then negotiate with a given trainee for the production of a specifiable set of outputs to be produced to the standards established for them. Each of the outputs selected could also be further analyzed to determine the tasks associated with their production and the enablers required in the performance of those tasks. With these sets of data as inputs, the trainer could then design instruction in terms of programs, modules, packages, experiences, etc. in a way that would maximize the opportunity of the trainee to achieve a satisfactory level of competence.

In the design of a competency based program several conditions are implied by the output focus.

1. The program must be field-centered. To be field-centered does not necessarily mean that all training must occur in a field setting. It does mean, however, that the context, purpose, and evaluation of the program must derive from and culminate in the field. In the absence of an arena for the acquisition and demonstration of competence, training programs can never be sure that the criteria for competence in the field has been met.

2. The program can be personalized. A unique program can be provided each trainee in each unique context. While there might be general standards of competence applied to the field, the individuality of trainees and of contexts would tend to result in programs being personalized to suit idiosyncrasies in people and settings within broad limits. As many options as possible could be provided the trainee when he reaches the point at which he is able to choose his own professional goal. Once the trainee has selected the setting for which he is preparing he may be trained to achieve a relevant set of outputs unique to his talents within that specific setting. This requirement emphasizes the necessity of establishing a process of negotiation designed to assist the trainer and trainee in arriving at a "program."

3. Standards applied to outputs must be clear and public. Trainees as well as trainers should be made aware of the specific standards applied within contexts and of the standards held for similar outputs by "others" in the field. The measures that constitute evidence of meeting context specific and general standards must be made clear.

4. The program can be subject to continuous assessment. Assessment of trainees at the level of enablers, tasks and

resulting outputs, and assessment of trainee ability to assume contextual job roles through the achievement of outputs, is useful, if not essential, to a competency based program. Evidence of trainee progress at each level of training serves the needs of the trainee in terms of personal growth and matriculation, the trainer in terms of program modification, and the prospective certifier or employer in terms of competencies acquired.

All the data presented in this volume have given repeated evidence that educational RDD&E, at least at the present time, is a unique domain which calls for unique kinds of training. The model suggested here has been suggested specifically by the data obtained in the Oregon Studies. While it may have general utility, the model is considered to be most appropriate to the specific demands of the domain of educational RDD&E as they exist at this point in time and are reflected by the Oregon Studies data. Others who come to understand the data from the Oregon Studies will, hopefully, be able to utilize the model suggested either to guide training program development or as a springboard from which to develop other models for the same data base.

It may well be that it is just as important to give a trainee a sense of "role" as it is to help him develop competence in terms of the outputs he is able to produce. The sets of outputs selected for training may in effect, describe the parameters of a role and thereby help to define it in much the same way that the complete Oregon Studies data describe the parameters of a domain and help to define it. Using output as the unit of analysis in looking at competence may bring greater clarity to the understanding of role and the competencies associated with it.

Competence, in the final analysis, is a judgment regardless of the level analysis selected. In order for a trainee to "be" competent he must be judged so by someone else, e.g., the trainer, certifier, employer, etc. The judgments made of a trainee, or of a practitioner for that matter, will likely be made on the basis of a variety of evidence, including the way the person making the judment "feels" about the person being judged. The data from the Oregon Studies suggest that evidence of the ability of a trainee or practitioner to produce outputs to the standards established in a specific context or set of contexts is likely to be the most reliable and valid indicator of competence. If the outputs selected as the focus of training are truly representative of the responsibilities the trainee is eventually to assume, evidence as to the trainees facility in producing those outputs should provide the "judge" of competence with the major source of decision related data.

Chapter 16

RECOMMENDATIONS

It is customary for an expeditionary force to make recommendations to its sponsoring agency upon return. Since the Oregon Studies have been cast in the light of an exploratory or expeditionary force it would seem that the custom should be maintained. Accordingly, the present chapter contains a series of recommendations to the agency that sponsored the Oregon Studies as to the steps that need to be taken next to gain full advantage of what has been accomplished thus far. The recommendations reflect an effort to mesh the biases of the staff of the Oregon Studies, the knowledge and sensitivities gained as a consequence of the Studies, and the set of concerns that prompted the commissioning of the Oregon Studies initially. Hopefully the recommendations that are made reflect accurately what has been learned as a consequence of the Studies, the relevance of that which has been learned to the concerns of the sponsor, and the urgency of the steps that now need to be taken.

In studying the recommendations the reader should be aware of the multiple frames of reference within which they have emerged. Four frameworks are critical in this regard: (*a*) the perception that the sponsors' frame of reference was and still is primarily that of personnel development, but that central within that frame is the desire to establish a data dependent model of training and the belief that the theory and data generated in support of training has utility within the field of educational RDD&E generally; (*b*) the charge of the Oregon Studies to further the aims of the sponsor by first developing the conceptual and methodological tools needed to establish a strong data base for training, and then applying those tools to the development of an initial, and admittedly limited, data base for training;[1] (*c*) the decision made early in the Oregon Studies that the aims of the sponsor could be served best by viewing the Studies as basic science activities rather than a set of activities aimed at having immediate and directly translatable impact upon the design and operation of training programs; and (*d*) the perception of the staff of the Oregon Studies, as well as the advisory body to the Studies, that the basic challenge of the Studies was no less than laying the groundwork for a discipline of educational RDD&E. The task of providing a first approximation to the conceptual structure of educational RDD&E, of providing a reliable methodology for the empirical investigation of that structure, and of providing a first set of empirical observations that tested the fit of the proposed conceptual frame with the realities that it was intended to map, was seen as a task aimed at establishing the cornerstones of a discipline. As stated in Chapter 1:

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[1] In the design of the Oregon Studies there was a deliberate decision to sacrifice data yield for conceptual and methodological development (see Chapter 1 for a discussion of the rationale underlying this decision).

> "Just as the journey of Lewis & Clark opened the western part of the United States to exploration, development, and commerce, and the explorations of Cousteau and the Apollo program have opened the ocean and the solar system to similar possibilities, the Oregon Studies were designed to turn the tools of educational RDD&E upon themselves and so open the field to exploration and development in service of American education. In the judgment of those who have been most deeply involved in the project the perception of the challenge as anything less would have been to miss the point of the whole effort." (p. 15)

The recommendations that follow are a result of the interaction of these multiple frames of reference with that which was experienced in the exploratory expedition that was the Oregon Studies. In recognition that all things cannot be done at once, an effort has been made to sort the recommendations into those that need to be attended to most urgently and those which can be postponed or which follow logically from the first wave of recommended follow-on activities. No attempt has been made to accompany the recommendations with suggestions as to how the activities proposed are to be implemented.

First Stage Follow-on Activities
(July 1, 1972 - June 30, 1973)

Recommendation 1.

Recycle the conceptual effort started in the Oregon Studies, utilizing the conceptual and empirical base established through the Oregon and AERA Studies as a point of departure.

The conceptual papers and critiques presented in Volume III in the series of volumes reporting the Oregon Studies represent the results of a major effort to bring about conceptual clarity within the field of educational RDD&E. As such the volume represents an excellent base for further conceptual effort. Individually, however, the frameworks outlined in the volume are far from completed statements, and collectively they signal that the conceptual task that confronts the field as a whole has only begun to be approached. Given the criticalness of conceptual clarification to any discipline or field of endeavor, it seems essential that the task of conceptual development be reactivated immediately. The fact that there is now a beginning data base against which to reflect that effort is seen as an encouraging condition.

Recommendation 2.

Commission a series of interpretive papers that will spell out the utility of that which has emerged from the Oregon and AERA Studies for a variety of targeted audiences.

By casting the Oregon Studies, and to some extent the AERA Studies, in the role of basic science efforts, the form in which they have been reported tends to serve the interests of scientists better than the interests of practitioners. The purpose of Recommendation 2 is to begin the process of analyzing these reports from the point of view of the utility they might have for various consumer groups, and to begin the task of translating the reports into a format that permits their utility to be recognized and acted upon. In thinking about potential consumer groups for the information contained in the reports, the following come to mind: the directors and staff of personnel development programs; the directors of and staff engaged in ongoing RDD&E activities; the administrators of institutions and agencies responsible for the conduct of educational RDD&E activities; the administrators of institutions and agencies that work cooperatively with educational RDD&E personnel; and persons responsible for the development of policy in relation to all such activities. Obviously, the form and substance of the interpretive papers would need to vary according to the consumer group being addressed.

Recommendation 3.

Recycle the training model development effort that was initiated as a companion activity to the Oregon and AERA Studies, using the models that have been developed, the experience that has accrued in implementing those models, and the data that have emerged from the Oregon and AERA Studies as a point of departure.

Just as the conceptual papers developed within the Oregon Studies represent only a first step towards the conceptual task that needs to be completed within the field, the data dependent models that have been developed thus far for the preparation of personnel within the field represents only a first step in the overall task of model building. The models are as yet incomplete and they have only begun to be tested. Given the significance of strong personnel development programs to a professional area such as educational RDD&E, and the potential generalizability of a data dependent model of training to other areas of professional preparation, it would seem that the model building effort should be reactivated immediately. The availability of the models developed during the course of the initial effort, the experience that has been gained in their implementation, the data base that now exists that did not exist at the time of the initial effort, and the availability of comparable models from other areas of professional education should facilitate the task considerably.

Recommendation 4.

Assign a task force to review the data generated within the Oregon and AERA Studies to determine the additional analyses that should be run on it, and the nature and extent of the data that should be added to it.

Because of time and resource constraints the analyses carried out and reported in the Oregon Studies represents only a partial set of the analyses that could be undertaken with the data available. This is probably the case as well for the AERA Studies. Given the large investment of resources in the collection of these two sets of data, and the potential utility that resides within them, it would seem wise to have them analyzed as fully as possible. The preparation of the interpretive papers that have been recommended would serve a most useful guide-on function in this respect. Those papers should also serve a useful guidance function in determining additional data needs, for in the course of their preparation both the needs of a variety of persons who would like to use such data and the adequacy of the data to meet those needs will be determined.

Recommendation 5.

Representatives from the various consumer groups to be served by any or all of the activities recommended thus far should be party to those activities.

It seems desirable to include the representatives of the various consumer groups on three counts, (a) their interest in and support of the implementation effort would facilitate the production of relevant outcomes, (b) insuring the relevance of those outcomes would be in the best interests of all concerned, and (c) their participation is in keeping with those strategies found essential to serving the purposes of development, diffusion, and evaluation.

Second Stage Follow-on Activities
(July 1, 1973 - June 30, 1974)

Recommendations:

6. Support some or all of the extended data analyses that would likely be proposed as a result of following Recommendation 4.
7. Support some or all of the new data collection efforts that would likely be proposed as a result of following Recommendations 1, 2, 3, and 4.
8. Support hypothesis testing research into the nature of educational RDD&E, and/or its interaction with on-line educational practice (such research would likely follow from the conceptual activity that would result if Recommendation 1 were pursued).
9. Design and implement an "inservice" training program for the directors of training programs that would keep them abreast of the model development activity that would result if Recommendation 3 were pursued.
10. Support the preparation of instructional materials that translate to a usable form that which has emerged from the Oregon and AERA Studies (the need for such materials would likely follow from the preparation of the interpretative papers that would result if Recommendation 2 were pursued).

Continuing Activities
(July 1, 1974 - -)

Recommendations:

11. Continue to support the development of the data base needed for training and other applied activities.

12. Continue to support hypothesis testing research on the nature of educational RDD&E, and/or its linkage to the practice of education.

13. Continue to support conceptual efforts so long as those efforts interact with an accumulating data base.

14. Continue to support model building efforts so long as those efforts interact with an accumulating conceptual and data base, and comparable model building efforts in related fields.

15. Continue to commission papers that interpret all of the above to the various consumer groups that find meaning in them.

EPILOGUE

The Parable of the Roads[1]

> "Would you tell me, please, which way
> I ought to go from here?" (asked Alice.)
>
> "That depends a good deal on where you
> want to get to," said the Cat.

The exchange between Alice and the Cat is most fitting as an introduction to the last section of the paper, for in the writers' judgment, educational RDD&E is at a cross roads. From our view there are three reasonably well defined roads which can be followed, though none promises a particularly smooth ride.

The first is the road that has characterized educational RDD&E historically. To a large extent this is a road dominated by classical research design and classical research interests in education, for example, acquisition and retention studies, transfer studies, teacher characteristics studies, and teacher behavior studies. Evaluation, development, and diffusion, as these concepts have been discussed in the present paper, are largely missing. In the light of the present day this is a relatively narrow road and one that is marred by potholes, blind corners, and an almost nonexistent sign post system alerting the traveler as to where he is going.

The second road that is open to travel by educational RDD&E personnel is one that has been opened only recently and one that is not yet completed. This is the road that takes the form of a super-highway begun less than a decade ago and has lanes accommodating not only research, but development, diffusion, and evaluation, as well. And, each lane of the super-highway is sufficiently wide and well-surfaced so as to accommodate new, high speed, high powered, roomy vehicles. Exemplary efforts along these new lanes are such endeavors as "county agents" for encouraging and demonstrating innovative educational methodologies, the vast ERIC dissemination system, educational accountability and performance contracts, systematic derivation and structuring of relevant student performance objectives, and development of major instructional packages for increased management of the total learning situation for individual students. The problem with this road is that it is still under construction; it has not as yet been surfaced; and, only the first few miles have been established. As a consequence there are signs all along the way that read "Proceed with Caution," "Work in Progress," "Detour," and "Stop! New Road Under Construction." There are sign posts along the way that tell the traveler where the road has come from, and where it ultimately hopes to go, but confidence in the likelihood that it will even reach its destination is a matter of faith.

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[1] The "Parable of the Roads" appears as the last section within the Schalock-Sell conceptual paper in Volume III of the Oregon Studies. It is quoted here in its entirety.

From the writers' view this situation is not disappointing. The Oregon Studies alone have generated considerable amounts of new data about the nature of RDD&E activities, more than can be accommodated fully by a training program in its initial year or two of operation. Hopefully, additional studies will soon be undertaken so that, as the data generated by the present studies are internalized, the next level of data will become available. This assumes, of course, that there will be some who will travel the access road that leads to empirical research and development with respect to educational RDD&E, a hope that is contingent upon commitments of the keepers of the road.

Notes to the Keepers of the Roads

Like the personnel who staff RDD&E activities, those who determine policy about such matters and control funds that support such activities have come to the same crossroads. And, as in the case of RDD&E personnel, it is the writers' belief that they should support work on all three roads. The basis for this belief is not the simple, blind assumption that good things will come from the indiscriminate support of all kinds of activities. It rests instead on the kinds of arguments that have been outlined in the paragraphs above, and the belief that the essentially yet-untraveled road represents a significant new option for policy-makers to support.

It is also our belief that the new option will be an attractive one at the policy-setting level, for in it there is promise of sharpening the tools with which to attack the problems encountered in the nation's schools. The investment of what is now billions of dollars in RDD&E activities --through Title III of the ESEA legislation, through the Cooperative Research Act, through the decade of support for the National Center for Educational Research and Development, the Bureau of Research, and the like--must be seen as evidence concerning the faith of the Congress and others in the power of the activities about which this paper is written. But the perpetual disappointment in the payoff of such activities in the little good that can be traced directly to them, must be having its effects upon the strength of that commitment. Because the investment in the empirical investigation of RDD&E would be relatively small compared to the overall budget for such activities within the context of education, because the time span needed for such research is relatively short, and because the potential payoff is so high, extended work upon the access road and its support systems should be undertaken. Just as the microscope and the telescope and the laser beam and the cloud chamber have opened vast new arenas of research and development in other fields, with all of their attendant consequences for the social good, the development of the methodology of RDD&E could have similar consequences.

The keepers of the roads are, after all, the ones responsible for the quality of the road system that exists. If good roads are wanted or needed, then good technology must be established for their creation. The empirical investigation of the domain of educational RDD&E would develop such technology.

The third road discernible at the cross roads is an access road that parallels the freeway. Its ultimate purpose is to provide the support systems needed to plot the course of the freeway, build it, maintain it, service its travelers, and develop new capabilities at road building. It leads to the tool shops, the research laboratories, and the testing centers of the road builders. It also leads to centers that prepare personnel to man the roads, or to regenerate or refreshen those who have been on the road for a long while.

Unfortunately for the traveler, this is a newly commissioned road, and thus far only its pathway has been marked.[2] The traveler is not at all sure where the road leads or what the tool shops, research laboratories, testing stations, or personnel training centers will look like. Moreover, there is no assurance that the road will ever be opened, or that the support services it is supposed to give access to will ever be established. The keepers of the roads are not at all sure that an access road, and the support systems it is designed to provide, represent good investments. After all, the concept of the freeway emerged without such "fancy extras;" and, it's even built without their assistance. Why should precious resources be spent on that which isn't absolutely necessary, and which may not be needed at all?

When standing at the cross roads which of the three options available should the RDD&E traveler pursue? Should he take the well traveled road of research, taking particular care to avoid the potholes, approach the blind curves with caution, and take extra care to be sure that the road is leading him to the end he wishes to reach? Or, should he enter the superhighway where, even with all the "Proceed With Caution" and "Road Under Construction" signs, the other travelers are pressing their new machines at such a pace that there is danger to those who have a smaller machine, or who wish to drive more slowly? Even with the danger of being run over or shoved out of the way and with all the noise, the dust, and the confusion of the big machines moving down all four lanes, the superhighway still has some attractions. It looks like it's going in the direction a lot of RDD&E personnel wish to go, and it looks like it would let one get there relatively fast. And, once the road is surfaced, it should be relatively smooth traveling. Such attractions are hard to turn down.

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[2] The commission for the access road and some of its support systems came less than two years ago with the decision on the part of the Office of Personnel Development and Training within the National Center for Educational Research and Development, U.S. Office of Education, to establish an empirical base for their training programs. Some advance survey parties such as Clark and Hopkins (1969), Sieber and Lazarsfeld (1966), and Cronbach and Suppes (1969), had studied the advisability and feasibility of creating such a road. But, it was not until the funding of the AERA Task Force Studies, the Oregon Studies, and the Training Design Projects that well financed survey parties and planning studies were established. The results of the Training Design Studies are in and three personnel training centers have been established. The results of the survey parties are only now being completed so the future of the access road is still uncertain.

What are the attractions of the road that leads to the information and technology base that permits the improvement of the first two roads or the building of better roads in the future? It leads in a sense to the source of that which makes more hopeful the prospects of traveling either of the other two roads. All that equipment looks impressive--it should help--but too few have used it and many lack confidence to climb into the operator's seat.

So what road should the RDD&E traveler choose? Fortunately, while one man has to make one choice, the discipline of educational RDD&E can choose all three, and pursue them simultaneously. It is the writers' belief that this is the strategy which should be followed. The rationale underlying this position, some recommendations as to steps to take along each way, and some implications of the present paper for those steps are outlined in the paragraphs which follow. The paper closes with some general comments on the applicability of the present paper to personnel training and policy setting.

Following an Improved Old Road

The case has been built sufficiently well and sufficiently often for the necessity of a solid knowledge base for any of man's endeavors, so that argument need not be repeated here. What does seem to be worth saying is what the conceptual frameworks or the theoretical structures must be in order to develop a strong knowledge base. The constructs or concepts that constitute those frameworks must be well explicated and critically tested for their utility. And, advances in design and methodology must keep pace with the advances in theory so that the power of such frameworks can be fully utilized.

Fortunately, the kind of conceptual base being called for is beginning to emerge in education. The work on aptitude treatment interaction, the concept of mathemegenic research (Rothkopf, 1970; Frase, 1970), the concept of learning environments (Barker, 1968; Mitchell, 1969), and the concept of a teacher as the manager of learning environments (Tyler, 1950; Schalock, Kersh, and Horyna, 1970a; Schalock, 1971) are all indicative of the kind of change envisioned if research is to provide the knowledge base that has utility to other researchers or to practitioners in the field.

Joining with the Builders on the New Road

Given the need for, the power of, and the demonstrated potential of the tools of systematic development, evaluation, and diffusion, there would seem to be no other choice but to join forces with the engineers of these activities. New ground is being broken in each of these areas, some wisdom is accumulating, methodologies are being devised and tested, and enough outputs are emerging from them that have enough value to enough people that a wide-spread base of support and enthusiasm for them is being engendered. As pointed out in the present paper, however, there is sufficient confusion and uncertainty in all three of these areas that their effectiveness at this point in time is limited. It is also probable that it will continue to be limited until our knowledge about these activities is significantly increased. A major purpose of the present paper was to provide a conceptual framework that would facilitate the extension of that knowledge base.

Utilizing the Modernized Tools and Resources

In the writers' view the critical road to be followed in the immediate future is the road that leads to the increased understanding of the domain of educational RDD&E. The case has been argued in the present paper that the activities that comprise this domain constitute the primary problem solving tools available to the field of education, and that to employ them well they must be more fully understood than they are at present. It is also argued that a necessary way to increase our understanding about such tools is to submit them to empirical investigation. The major thrust of the present paper is a conceptual framework that defines and relates the conceptual structure of the domain in such a way that it could become subject to empirical investigation. Given the availability of a framework (assuming that it is adequate to the task), the critical need is for its empirical referencing. A great deal of time should not be wasted before learning to use the newer tools and resources emerging.

Personnel Training Centers

The context within which the present investigations were commissioned was one of personnel training. Largely because of dissatisfactions with the old road and the manpower needs of the builders of the superhighway, the move to obtain empirical data on the domain of educational RDD&E was undertaken. New training programs have been established[3] and are obstensibly awaiting the data from the survey parties to help guide the substantive development of their programs. The question that must now be considered is one of the utility of the data that have been collected.

Without question, the data from the empirical studies will have some utility for the new and existing training programs for educational RDD&E manpower. While speaking now only for the Oregon Studies, data will be forthcoming on all dimensions of the conceptual sets provided in the previous section of the paper. While these data are primarily descriptive and parameter testing, rather than normative or hypothesis testing, they will do much to identify the nature of RDD&E activities as they appear within education at this point in time. As such, this should provide necessary sensitivities to the designers of training programs, even though they will not provide definitive answers to substantive questions about the field.[4] This is not an unexpected circumstance, for the decision was made early in the Oregon Studies to sacrifice data yield for methodological development.

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[3] Three experimental training programs have been established as of this writing: The Far West Laboratory Consortium which focuses on the preparation of developers and diffusers; the Learning Research and Development Center in Pittsburgh which focuses on the preparation of instructional systems designers; and the Consortium of the Ohio State University which focuses upon the preparation of field-centered evaluators.

[4] A number of training, staffing, and organizational issues were raised during the course of the Oregon Studies Project. Volume I presents these issues in light of the data which have been collected and analyzed.

GLOSSARY

ADOPTION 1. the taking of and using as one's own. 2. in present usage, refers to the acceptance for use of KNOWLEDGE, INFORMATION, and/or TECHNOLOGY.

CLUSTER 1. a number of different things grouped together on the basis of more general qualities shared among them. 2. in present usage, refers to a basis for grouping and classifying large numbers of specific OUTPUTS and TASKS, such groupings referred to as cluster categories.

CHARACTER 1. the distinctive kind or sort that a thing is. 2. in present usage, refers to a classification given an OUTPUT that is distinguishable as an instance of KNOWLEDGE, TECHNOLOGY, IMPLEMENTATION, or INFORMATION.

COMPONENT 1. a part or integral ingredient in a whole. 2. in present usage, a classification given an OUTPUT having such relationship to a FOCAL OUTPUT. See FOCAL and FACILITATING.

CONDITION 1. manner, circumstance, or state of being. 2. in present usage, a STRUCTURE classification given an OUTPUT which represents an instance of a desired circumstance expected to endure within the life of a PROJECT, or beyond the PROJECT as a result of it.

CONTEXT 1. the situation, background, and environment within which a specified set of focused activities occurs. 2. in present usage, "focused activities" refers to PROJECT, and "situation... environment" to its FOCUS, SETTING, SIZE, CONTENT.

DEVELOPMENT 1. a working out in detail or expansion of (a technique). 2. in present usage, refers to: (a) engaging in a problem-solving strategy designed to produce reliable TECHNOLOGY, that is, procedures, materials, hardware, and organizational frameworks that have a known degree of success in bringing about a particular outcome or in performing a defined OPERATION; (b) a FOCUS classification given a PROJECT.

DIFFUSION 1. the conveying of something from one person, place, or situation to another. 2. in present usage, refers to: (a) a problem-solving strategy designed to bring about the IMPLEMENTATION of generalizable KNOWLEDGE, a reliable TECHNOLOGY, or trustworthy INFORMATION (as used here diffusion incorporates the concepts of DISSEMINATION, ADOPTION, and UTILIZATION); (b) a FOCUS classification given a PROJECT.

DISSEMINATION 1. scattering far and wide. 2. in present usage, refers to the distribution of KNOWLEDGE, INFORMATION, and/or TECHNOLOGY to a targeted population.

EDUCATIONAL RDD&E a coordinated set of problem-solving strategies designed to produce OUTPUTS that can be judged as to their quality and their contribution to the solution of educational problems.

ENABLER 1. that which makes able, provides with means, power or authority. 2. in present usage, it refers to those KNOWLEDGES, SKILLS, and SENSITIVITIES needed to produce a particular OUTPUT.

EVALUATION 1. finding the values or amounts of (a phenomenon). 2. in present usage, refers to: (a) engaging in a problem-solving strategy designed to produce trustworthy INFORMATION regarding a phenomenon which occurs in a context or environment over which the user expects to exercise influence or about which he expects to make decisions; (b) a FOCUS classification given a PROJECT.

EVENT 1. happening or occurrence. 2. a STRUCTURE classification given an OUTPUT which represents an instance of occurrence of an observable transaction or set of behaviors.

FACILITATING 1. making easier or assisting the performance or accomplishment of. 2. in present usage, a classification given an OUTPUT having such relationship to and which is not an instance of a COMPONENT or FOCAL OUTPUT. See COMPONENT and FOCAL.

FOCAL 1. of or pertaining to the center of activity or attention as a matter of contractual (implied or otherwise) obligation. 2. in present usage, a classification given an OUTPUT having such relationship to the outcomes of the efforts of a PROJECT. See COMPONENT and FACILITATING.

FOCUS 1. concentration: as, a *focus* on a kind of strategy. 2. in present usage, refers to a classification given a PROJECT having as the primary concentration of problem-solving work effort a strategy characteristic of either RESEARCH, DEVELOPMENT, DIFFUSION, *or* EVALUATION.

FUNCTION 1. a special duty or service rendered by a person or thing in the course of work or activity. 2. in present usage, refers only to a classification given an OUTPUT in accordance with the POLICY (setting), MANAGEMENT, or PRODUCTION service it renders to the course of PROJECT work.

IMPLEMENTATION 1. the carrying into effect and using of. 2. in present usage: (a) a CHARACTER classification given an OUTPUT which represents an instance of the ADOPTION and UTILIZATION of KNOWLEDGE, TECHNOLOGY, and/or INFORMATION; hence, (b) an OUTPUT of DIFFUSION.

INDEX 1. a list describing the items of a collection. 2. presently used in relation to an OUTPUT *index*, a listing of the OUTPUTS of a PROJECT.

INFORMATION	1. trustworthy facts or data descriptive of something without reference to interpretive or value judgments relating to that description. 2. in present usage: (a) a CHARACTER classification given an OUTPUT which represents an instance of such facts or data; hence, (b) an OUTPUT of EVALUATION.
KNOWLEDGE	1. empirically verifiable ideas inferred from facts or data which add to that which is known. 2. in present usage: (a) a STRUCTURE classification given an ENABLER which represents an instance of that which is to be known as a requisite to accomplishment of an OUTPUT; (b) a CHARACTER classification given an OUTPUT which represents an instance of such newly inferred and generalizable ideas; hence, (c) an OUTPUT of RESEARCH.
LEVEL	1. a position within a dependent structure. 2. in present usage, *level* refers to one of three positions in the dependent ordering of OUTPUTS, i.e., FOCAL, COMPONENT, FACILITATING.
MANAGEMENT	1. the act or art of handling, orchestrating, and directing. 2. in present usage, a FUNCTION classification given an OUTPUT which orchestrates the resources (time, personnel, materials, space, INFORMATION) available to a PROJECT in the realization of outcomes expected from it, or is a report of that orchestration.
MAP	1. a drawing or other representation of the relationships of. 2. in present usage, (a) a schematic ordering of the OUTPUTS of a PROJECT in accordance with their interdependent relationships (OUTPUT *map*); (b) a schematic ordering of the organizational structures which exist within the CONTEXT of a PROJECT (Contextual *map*).
OPERATIONS	1. any movement or series of movements made in fulfilling a purpose. 2. in present usage, refers to movements within a PROJECT in terms of the TASKS performed in the generation of the OUTPUTS for which the PROJECT is responsible.
OUTPUT	1. something manufactured, created, or produced. 2. in present usage, refers to: (a) an identifiable outcome of targeted work activity which contributes to the realization of PROJECT goals; (b) a STRUCTURE classification given STANDARDS which serve as criteria for judging the adequacy of an outcome of targeted work activity.
POLICY	1. any governing principle or guideline for a course of action. 2. in present usage, a FUNCTION classification given an OUTPUT which establishes the principles or guidelines to be attended by a PROJECT, such classification frequently referred to as *policy* setting.
PRIMARY	1. fundamental, elemental. 2. in present usage, refers to an initial categorization of interview data in which the category retains the fundamental and essential elements of each specific datum; hence, *primary* categories of OUTPUTS and TASKS.

PROCESS	1. a continuing procedure generally composed of many steps and/or involving many changes. 2. in present usage, a term combined with the term OPERATIONS as a STRUCTURE classification given STANDARDS which serve as criteria for judging the adequacy of procedures associated with specified OUTPUTS.
PRODUCT	1. something tangible or "hard" produced as an outcome of work effort. 2. in present usage, a STRUCTURE classification given an OUTPUT which represents an instance of a tangible outcome, concrete in form, and transportable at a given point in time.
PRODUCTION	1. the act of fabricating or creating. 2. in present usage, a FUNCTION classification given those OUTPUTS which build directly on the fabrication objectives of a PROJECT.
PROJECT	a formally recognized, funded and directed effort aimed at achieving one or more specified ends that have their definition in educational RESEARCH, DEVELOPMENT, DIFFUSION, and EVALUATION.
RESEARCH	1. studious inquiry, examination, investigation, or experimentation aimed at the generation of KNOWLEDGE. 2. in present usage, refers to: (a) engaging in a problem-solving strategy designed to produce ideas, principles, theories, and laws that can be shown to be generalizable through empirical verification; (b) a FOCUS classification given a PROJECT.
SENSITIVITY	1. a quality of having perceptiveness and responsiveness. 2. in present usage, a STRUCTURE classification given an ENABLER which represents an instance of a specific perceptiveness and responsiveness considered requisite to accomplishment of an OUTPUT.
SETTING	1. environment, background, or surroundings of a place. 2. in present usage, setting refers to a classification given a PROJECT residing essentially in a college or university, R&D agency, private firm, or public school environment.
SIZE	1. extent, scope, or magnitude of a thing. 2. in present usage, refers to the current fiscal year funding and number of professional staff of a PROJECT, taken independently and in combination.
SKILL	1. ability, proficiency, or expertness in accomplishing something. 2. in present usage, a STRUCTURE classification given an ENABLER which represents an instance of a specific ability considered requisite to accomplishment of an OUTPUT.
STANDARD	1. a grade of excellence or attainment regarded to be a measure of the adequacy of something. 2. in present usage, a specific criterion applied to, excellence expected of, or a criterion by which judgments of adequacy are made about OUTPUTS and PROCESS/OPERATIONS.

STRUCTURE 1. an orderly arrangement of the parts of a whole. 2. in present usage, refers to the constructs which identify the parts of each of several wholes, as in *structure* of OUTPUTS (PRODUCTS, EVENTS, CONDITIONS), *structure* of STANDARDS (OUTPUT, PROCESS/OPERATIONS), *structure* of ENABLERS (KNOWLEDGES, SKILLS, SENSITIVITIES).

TASK 1. any discrete piece or unit of work. 2. in present usage, a discrete unit of work performed among other similarly targeted units in producing or achieving a specific OUTPUT to the STANDARDS set for it.

TECHNOLOGY 1. a technical method of or framework for achieving a practical purpose. 2. in present usage: (a) a CHARACTER classification given an OUTPUT which represents an instance of a reliable strategy, procedure, hardware, or set of materials designed to bring about a particular outcome or to perform a defined OPERATION; hence, (b) an OUTPUT of DEVELOPMENT.

UTILIZATION 1. the making use of. 2. in present usage, refers to the making use of KNOWLEDGE, TECHNOLOGY, and/or INFORMATION.

APPENDIX 1

Primary Categories of Outputs, and the Number of Outputs Identified Within Them By Project Focus

Primary Output Category		Project Focus				Output Totals (20)
Set FGHI Coding	Products	Res (5)	Dev (7)	Dif (5)	Eval (3)	
0158	Evaluation Report	1	1	12	10	24
0013	Project Time Line/Schedule	4	6	7	3	20
0187	Descriptive Data Rests, Subject	14	1	3	1	19
0006	Terminal Report	6	3	4	3	16
0082	Questionnaire	2	5	6	2	15
0040	Description of Program/Project	1	3	8	2	14
0089	Status Condition Report	1	2	5	6	14
0095	Description/Specs for Output	0	12	2	0	14
0218	Quality Control Schema	0	14	0	0	14
0227	Compendium: Instr Objvs/Meas	0	14	0	0	14
0249	Staff Development Trng Unit	0	2	12	0	14
0099	Progress Report	4	5	3	1	13
0007	Proposal	2	6	1	1	10
0250	Pupil Svc Personnel Trng Unit	0	0	10	0	10
0046	List of Field Settings	1	4	4	0	9
0061	Observation System	1	1	2	5	9
0256	Field Test Plan	0	5	4	0	9
0220	Data Analysis Procedures	4	3	0	1	8
0281	Evaluation Plan/Design	0	6	1	1	8
0053	Abstracted Descript: Programs	0	2	5	0	7
0081	Interview Guide	2	4	0	1	7
0117	Program (within project) Plan	0	1	2	4	7
0144	Financial Report	1	0	6	0	7
0164	Diffusion Manual/Guidelines	0	0	7	0	7
0201	Professional Report/Monograph	2	3	1	1	7
0217	Observation Record Form	0	5	2	0	7
0222	Data Collection Procedures	1	3	2	1	7
0266	Journal	0	0	7	0	7
0324	Budget Allocations	1	3	2	1	7
0002	Research Design	3	1	1	1	6
0034	Instructional Unit Use Guide	1	4	1	0	6
0055	Report Specifications	0	0	3	3	6
0108	Supplementary Instr Materials	0	6	0	0	6
0203	Learning Activity Books	0	0	6	0	6
0224	Attitude Meas, Cognitive Value	0	4	0	2	6

APPENDIX 1

(Continued)

Primary Output Category		Project Focus				Output Totals (20)
Set FGHI Coding	Products	Res (5)	Dev (7)	Dif (5)	Eval (3)	
0230	Technical Report	3	0	1	2	6
0267	Indexes	0	0	6	0	6
0286	Survey Reports	0	0	2	4	6
0017	Terminal Instr Objectives	0	5	0	0	5
0044	Interview Data/Information	0	1	1	3	5
0067	Implementing Plan, I-M Handling	0	4	1	0	5
0097	Journal Article, Published	2	2	1	0	5
0135	Television Program Magazine	0	0	5	0	5
0140	Promotional Phonograph Records	0	0	5	0	5
0160	Training Film for Educators	0	0	3	2	5
0169	Diffusion Impact Data	0	3	2	0	5
0188	Normative Data	0	0	2	3	5
0190	Product Review/Critique	0	4	1	0	5
0223	Taxonomy for Learner Outcome	0	5	0	0	5
0228	Compendium: Instr Objectives	0	5	0	0	5
0235	Baseline Data	3	2	0	0	5
0252	Information Brochures	0	0	3	2	5
0261	Formative/Field Test Eval Data	0	2	0	3	5
0001	Prototype Tryout Data	1	3	0	0	4
0031	Criterion-Based Test Item Pool	0	4	0	0	4
0033	Learner Data File	0	1	1	2	4
0085	Project Operational Plan	0	4	0	0	4
0145	Intraagency Opns Control Form	1	0	3	0	4
0185	Needs Identification Data	0	2	1	1	4
0199	Item Analysis Data	0	2	2	0	4
0211	Handling Sys: Project Outputs	0	0	4	0	4
0226	Rationale for Objvs and Msmt	0	4	0	0	4
0303	Computer Instr in Computer Use	0	4	0	0	4
0024	Audio Tape Instr Modules	0	1	1	1	3
0038	Research Data	1	1	1	0	3
0042	Selection Criteria: Sites etc.	0	0	2	1	3
0083	PERT Chart	0	3	0	0	3
0118	Formulated Policy	0	0	3	0	3
0146	Contracts for Services	0	0	3	0	3
0154	Specifications for Personnel	0	0	1	2	3

APPENDIX 1

(Continued)

Primary Output Category		Project Focus				Output Totals (20)
Set FGHI Coding	Products	Res (5)	Dev (7)	Dif (5)	Eval (3)	
0183	List of Resource Personnel	0	1	2	0	3
0195	Social Interaction Data	1	0	1	1	3
0204	Learning Activity Toys/Games	0	0	3	0	3
0244	Coded Data	1	0	2	0	3
0279	Conceptual Framework	0	2	1	0	3
0289	Directories	0	0	1	2	3
0309	Worksheets: Proj Documentation	0	0	3	0	3
0332	Magazine/Newspaper Articles	0	0	3	0	3
0019	Content Outline, Instructional	0	2	0	0	2
0026	Computer Asst/Ext Instr Units	0	2	0	0	2
0029	Site Assessment Criteria	0	0	1	1	2
0047	A/V Descriptions of Programs	0	0	2	0	2
0049	Progress Check Test	0	1	0	1	2
0052	Panel Book Visuals: Audio Tape	0	1	1	0	2
0074	Specs: Operation Requirements	0	2	0	0	2
0076	Specs: I-M Handling Sub-Systems	0	2	0	0	2
0078	Major Task Descriptions	0	2	0	0	2
0087	List of Potential Output Users	0	2	0	0	2
0091	Performance Specs: I-M System	0	2	0	0	2
0092	Design Alternates for Evaluation	0	2	0	0	2
0096	Evaluation Checklist	0	1	0	1	2
0104	Instructional Package, Medium	0	2	0	0	2
0105	Instructional Package, Small	0	2	0	0	2
0121	Script, Film	0	1	1	0	2
0129	Television Program	0	0	2	0	2
0131	Live Action Film: Reading Prog	0	0	2	0	2
0132	Video Tape, TV Prog Component	0	0	2	0	2
0138	Story Boards	0	1	1	0	2
0139	Non-fiction Books (commercial)	0	0	2	0	2
0149	Ref Index: Film for TV Program	0	0	2	0	2
0150	Scripts for TV Program	0	0	2	0	2
0152	Video Tapes, completed TV Prog	0	0	2	0	2
0155	Info/Idea Notebook for Writers	0	0	2	0	2
0157	Sound Track: A-V Presentation	0	1	1	0	2
0159	Project Newsletter	0	0	1	1	2

APPENDIX 1

(Continued)

Primary Output Category		Project Focus				Output Totals (20)
Set FGHI Coding	Products	Res (5)	Dev (7)	Dif (5)	Eval (3)	
0175	Pre-sch Lrng Activities, Parent	0	0	2	0	2
0180	Pilot Instr Program (movie)	0	1	1	0	2
0192	Specs: Data Gathering Instrmnt	0	1	1	0	2
0194	Learner Achievement Data	1	0	1	0	2
0197	Descr of Research Variables	1	0	1	0	2
0209	Speech Texts	0	0	2	0	2
0216	Dissertations	2	0	0	0	2
0219	Student Performance Objectives	0	2	0	0	2
0231	List: Acquisition/Data	0	1	1	0	2
0232	Specs: Output Revisions	0	2	0	0	2
0233	Curricular Recommendations	0	2	0	0	2
0236	Single Concept Learning Unit	0	2	0	0	2
0238	Model of Content Discipline	2	0	0	0	2
0239	Compendium of Measures	2	0	0	0	2
0240	Working Papers	1	1	0	0	2
0242	Data Handling Codes	0	0	0	2	2
0245	Computer Printouts	2	0	0	0	2
0260	Summative Evaluation Data	0	0	1	1	2
0269	Correspondence	0	0	2	0	2
0270	Computer Program Documentation	0	0	2	0	2
0274	Usage Report	0	0	2	0	2
0282	Memos/Directives/Bulletins	0	1	0	1	2
0290	Census Data	0	0	0	2	2
0305	Project Promo Presentation Pkg	0	1	1	0	2
0310	Script: Film/Tape Presentation	0	0	2	0	2
0320	Trng Program in Group Dynamics	2	0	0	0	2
0329	Work Assignment Record	0	0	2	0	2
0003	Microformed Bibliographies	1	0	0	0	1
0016	Advisory Committee	1	0	0	0	1
0018	Enabling Instr Objectives	0	1	0	0	1
0020	Syndactic Text Instr Materials	0	1	0	0	1
0021	Remedial Units for Syndactic Texts	0	1	0	0	1
0022	Single-Concept Instr Films	0	1	0	0	1
0023	Video Tape Instr Modules	0	1	0	0	1
0025	Activities Outline: Instr Units	0	1	0	0	1
0027	Linear Programmed Instr Text	0	1	0	0	1
0028	Intrinsically Programmed Text	0	1	0	0	1

APPENDIX 1

(Continued)

Primary Output Category		Project Focus				Output Totals (20)
Set FGHI Coding	Products	Res (5)	Dev (7)	Dif (5)	Eval (3)	
0030	Materials Presentation Design	0	1	0	0	1
0032	Norm-Referenced Test Items	0	1	0	0	1
0035	Parent Instr Unit Use Guide	0	0	1	0	1
0036	Model: Developing Instr Units	0	1	0	0	1
0037	Computer-Based Instr Unit	0	1	0	0	1
0039	Interview Training Procedures	0	0	1	0	1
0041	Site Visit Checklist	0	0	1	0	1
0043	Guidelines for Site Visits	0	0	1	0	1
0045	Site Visitation Schedule	0	0	1	0	1
0050	Structural Communication Unit	0	1	0	0	1
0060	Validation Criteria for Data	0	0	1	0	1
0062	Team Rotation Plan	0	0	1	0	1
0064	Cost Estimates	0	1	0	0	1
0065	Test Procedure, I-M Handling System	0	1	0	0	1
0066	List of Project Products	0	1	0	0	1
0068	Review/Concurrence I-M Handling	0	1	0	0	1
0069	Design Review Data, I-M System	0	1	0	0	1
0070	Design for I-M Handling System	0	1	0	0	1
0071	Design Review Report	0	1	0	0	1
0072	Specs: Hardware Requirements	0	1	0	0	1
0073	Specs: Software Requirements	0	1	0	0	1
0075	Manual for I-M Handling Sys	0	1	0	0	1
0077	Specs: Automated I-M System	0	1	0	0	1
0079	Cost Categories: Oper System	0	1	0	0	1
0086	Bibliographies	0	1	0	0	1
0088	List of User Needs	0	1	0	0	1
0090	Report of Operations Analysis	0	1	0	0	1
0093	Design Concepts, I-M System	0	1	0	0	1
0094	Automated I-M Handling System	0	1	0	0	1
0106	Cumulative Post Test	0	1	0	0	1
0107	Master Tutor Instr Unit	0	1	0	0	1
0110	Content Map for Instr Course	0	1	0	0	1
0115	Project Products Dstrb System	0	0	1	0	1
0125	Promotional Film	0	0	1	0	1
0128	Multimedia Leadership Course	0	1	0	0	1

APPENDIX 1

(Continued)

Primary Output Category		Project Focus				Output Totals (20)
Set FGHI Coding	Products	Res (5)	Dev (7)	Dif (5)	Eval (3)	
0130	Animated Film: Reading Program	0	0	1	0	1
0133	Serialized TV Adventure Script	0	0	1	0	1
0134	Serialized Story Manuscript	0	0	1	0	1
0136	Curriculum for Reading Program	0	0	1	0	1
0137	Ref Manual: Instr in Reading	0	0	1	0	1
0141	Film Strip Promotional Unit	0	0	1	0	1
0147	Live-Action Film for TV Show	0	0	1	0	1
0148	Animated Film for TV Show	0	0	1	0	1
0151	Curriculum for Ed TV Program	0	0	1	0	1
0153	Specifications for Facilities	0	0	1	0	1
0161	Diffusion Staff Trng Program	0	0	1	0	1
0162	Demo of Follow-Up to A-V Learning	0	0	1	0	1
0163	Training Film for Parents	0	0	1	0	1
0167	Community Resource Directory	0	0	1	0	1
0168	Demographic Data	0	0	1	0	1
0170	Community Resource Data	0	0	1	0	1
0171	Pre-School Guide Activity Data	0	0	1	0	1
0172	Pre-sch Lrng Matter Teacher Use	0	0	1	0	1
0173	Pre-sch Lrng Matter Parent Use	0	0	1	0	1
0174	Pre-sch Lrng Activities, Tchr	0	0	1	0	1
0177	Trng Program for Lay Personnel	0	0	1	0	1
0181	Interagency Opns Control Form	0	0	1	0	1
0182	List: Distrib Agencies/Points	0	0	1	0	1
0184	Mailing Lists	0	0	1	0	1
0186	Specs: Free Product Dtbg Sites	0	0	1	0	1
0189	Data on Product Appeal	0	0	1	0	1
0198	Sight Vocabulary List	0	0	1	0	1
0202	Catalog of Available Products	0	0	1	0	1
0205	Pre-school Text Books	0	0	1	0	1
0206	Educational Greeting Cards	0	0	1	0	1
0208	Plans: Future Project Dvlpmnt	0	1	0	0	1
0212	Educational Calendar	0	0	1	0	1
0213	Children's Activity Center	0	0	1	0	1
0214	Satellite Management Center	0	0	1	0	1
0215	Learning Kit, commercial	0	0	1	0	1

APPENDIX 1

(Continued)

Primary Output Categories		Project Focus				Output Totals (20)
Set FGHI Coding	Products	Res (5)	Dev (7)	Dif (5)	Eval (3)	
0221	Source List for Objectives	0	1	0	0	1
0225	Rationale for Data Instrument	0	1	0	0	1
0229	Attitude Measure, Tolerance	0	1	0	0	1
0237	Model of skills Acquisition	1	0	0	0	1
0251	School Paper	0	0	1	0	1
0253	Curriculum Dvlpmnt Guidelines	0	0	1	0	1
0255	Interview Reports	0	1	0	0	1
0257	Conference/Workshop Agenda	0	1	0	0	1
0259	Evaluation Model	0	0	0	1	1
0268	Microform Copy	0	0	1	0	1
0272	Publication Proof Copy	0	0	1	0	1
0273	Publications (not identified)	0	0	1	0	1
0275	Project Objectives	0	1	0	0	1
0276	Articles: House Publications	0	1	0	0	1
0278	Prospectus/Letters of Intent	0	1	0	0	1
0280	Specs: Filming Techniques	0	1	0	0	1
0285	Organizational Chart	0	0	0	1	1
0287	Key Indicators: Condition School	0	0	0	1	1
0288	Task/Time Allotments	0	0	0	1	1
0291	Management Information Center	0	0	0	1	1
0292	Mediated Data Display	0	0	0	1	1
0293	Review/Refinement Procedures	0	0	0	1	1
0294	Operations Progress Chart	0	0	0	1	1
0297	Feedback System Classroom Mgmt	0	0	0	1	1
0301	PPBS Manual	0	0	0	1	1
0304	Computer Simulation: Operation	0	1	0	0	1
0306	Clearinghouse: RDD&E Outputs	0	1	0	0	1
0307	Use Guide for Card Sort System	0	0	1	0	1
0308	Data-Handling Cards	0	0	1	0	1
0321	Content Outline Guides/Manuals	1	0	0	0	1
0326	Reporting Procedures	0	1	0	0	1
0327	Coordination/Liaison Procedure	0	1	0	0	1
0334	Theory Papers	1	0	0	0	1
Totals		83	282	295	99	759

APPENDIX 1

(Continued)

Primary Output Category		Project Focus				Output Totals (20)
Set FGHI Coding	Events	Res (5)	Dev (7)	Dif (5)	Eval (3)	
0241	Selecting Personnel	1	2	9	4	16
0335	Revising Existing Materials	0	0	12	0	12
0176	Training Workshop/Conference	3	1	3	2	9
0015	Making Management Decisions	1	0	6	0	7
0114	Field Tests	1	2	3	0	6
0120	Acquiring Funds	0	0	6	0	6
0012	Assigning Work	2	1	1	1	5
0191	RDD&E on the Job Training	0	1	2	2	5
0246	Interpreting Data Analysis	2	0	1	2	5
0014	Disseminating Information	1	0	2	1	4
0119	Speeches	1	0	2	1	4
0165	Acquiring Facilities	0	1	3	0	4
0234	Reviewing Status/Quality	0	2	0	1	3
0264	Staff Meetings	1	0	1	1	3
0265	Collecting Data	0	0	0	3	3
0296	Planning Proj Opns/Guidelines	0	0	1	2	3
0317	Maintaining Project Progress	1	0	2	0	3
0258	Development (work) Conference	0	2	0	0	2
0271	Modifying Systems	0	1	1	0	2
0316	Coordinating Data Collection	2	0	0	0	2
0318	Maintaining Fiscal Acctability	1	0	1	0	2
0323	Making Policy Decisions	1	0	1	0	2
0331	Expanding Product Availability	0	0	2	0	2
0008	Evaluating Hardware	1	0	0	0	1
0011	Acquiring Microform Hardware	1	0	0	0	1
0098	Info Dissemination Workshop	0	1	0	0	1
0103	Acquiring Course Materials	0	1	0	0	1
0143	Acquiring RV Studio Hardware	0	0	1	0	1
0156	Pre-use Critique: A-V Program	0	0	1	0	1
0178	Acquiring Television Sets	0	0	1	0	1
0200	Policy Setting Seminars	0	0	1	0	1
0243	Interviewing	1	0	0	0	1
0262	Selecting of Performance Items	0	0	0	1	1
0277	Acquiring of Filming Equipment	0	1	0	0	1
0284	Staff Retreat	0	1	0	0	1

APPENDIX 1

(Continued)

Primary Output Categories		Project Focus				Output Totals (20)
Set FGHI Coding	Conditions	Res (5)	Dev (7)	Dif (5)	Eval (3)	
0311	Surveying by Telephone	0	0	1	0	1
0312	Surveying Costs	0	0	1	0	1
0313	Selecting Field Test Sample	0	0	1	0	1
0314	Coding Data	0	0	1	0	1
0322	Negotiating Participation/Coop	1	0	0	0	1
0325	Acquiring Operational Supplies	0	1	0	0	1
0328	Conducting Experiments	0	1	0	0	1
0333	Surveying the Literature	1	0	0	0	1
Totals		23	19	67	21	130

Primary Output Categories		Project Focus				Output Totals (20)
Set FGHI Coding	Conditions	Res (5)	Dev (7)	Dif (5)	Eval (3)	
0010	Adequate Staff	1	1	4	1	7
0100	Staff Welfare	1	1	2	1	5
0058	Quality Output	1	1	2	0	4
0193	Intra-Agency Coordination	1	0	3	0	4
0009	Managed Money Resources	2	1	0	0	3
0057	Decision Making Structure	0	1	1	1	3
0101	Intra/Inter Agency Relations	0	1	2	0	3
0109	Staff Morale	0	1	2	0	3
0247	Adequate Facilities/Equipment	2	0	1	0	3
0054	Staff Awareness/Acceptance	0	0	2	0	2
0084	Interagency Coordination	0	0	1	1	2
0111	Inter/Intra Agency Cooperation	0	2	0	0	2
0126	Relationship with TV Networks	0	0	2	0	2
0127	Adherence to Project Philosophy	0	1	1	0	2
0179	Consulting Services	0	0	2	0	2
0196	Effective Communications	1	0	1	0	2
0207	Project Management Structure	0	1	1	0	2
0263	Monitored Project Operations	1	0	1	0	2
0004	Project Publicity	1	0	0	0	1
0005	Adequate Field Setting	1	0	0	0	1

APPENDIX 1

(Continued)

Primary Output Category		Project Focus				Output Totals (20)
Set FGHI Coding	Conditions	Res (5)	Dev (7)	Dif (5)	Eval (3)	
0056	Compatible Work/Expense Rates	0	0	1	0	1
0059	Operation Efficiency, Project	0	0	1	0	1
0112	Project Accountability	0	1	0	0	1
0113	Site Personnel Welfare	1	0	0	0	1
0116	Managed Production Personnel	0	0	1	0	1
0124	Atmosphere: Feeling Effective	0	0	1	0	1
0166	Facilitated Product Distrib	0	0	1	0	1
0254	Community/Parent Involvement	0	0	1	0	1
0283	Adequate Information Flow	0	1	0	0	1
0295	Healthy Atmosphere: Criticism	0	0	0	1	1
0298	Maintained Program Operations	0	0	0	1	1
0299	Test Construction Service	0	0	0	1	1
0300	Measurement Service	0	0	0	1	1
0302	Informed Public	0	0	0	1	1
0315	Project Leadership	0	0	1	0	1
0319	Adequate Community Interface	1	0	0	0	1
0330	Adequate Support Linkages	0	0	1	0	1
0336	Coordinated/Compatible Outputs	0	0	1	0	1
Totals		13	14	36	10	73
Grand Totals		119	315	398	130	962

APPENDIX 2

Cluster Categories of Outputs, and the Number of Outputs Identified Within Them by Project Focus

Output Cluster Category		Project Focus				Output Totals (20)
Set DE Coding	Products	Res (5)	Dev (7)	Diff (5)	Eval (3)	
01	Reports/Contracts	21	25	47	29	122
04	Work Specifications/Procedures	5	45	21	7	78
27	Data (including printouts)	10	26	25	14	75
02	Data Instruments/Techniques	20	22	18	14	74
08	Plans/Designs/Theories/Models	8	44	14	7	73
05	Work Management Systems	7	20	23	12	62
03	Guides/Manuals	3	18	29	6	56
10	Publications	4	6	36	6	52
07	Resource Lists	2	31	11	0	44
14	Instructnl Units/Use w/Staff	2	4	30	3	39
12	Instructnl Units/In-School	0	26	3	0	29
13	Instructnl Units/Extra-School	0	0	18	0	18
11	Promotional Materials	0	1	16	0	17
28	Taxonomies	0	5	0	0	5
29	Recommendations	0	4	0	0	4
36	Curricular Objectives	0	3	0	0	3
37	Critiques	0	2	1	0	3
06	Data Management Systems	1	0	1	0	2
09	Equipment/Tools/Facilities	0	0	2	0	2
42	Prediction Variables	0	0	0	1	1
Totals		83	282	295	99	759

Output Cluster Category		Project Focus				Output Totals (20)
Set DE Coding	Events	Res (5)	Dev (7)	Diff (5)	Eval (3)	
32	Recruiting/Placing Staff	3	3	10	5	21
33	Collecting/Analyzing Data	4	2	5	5	16
52	Adapting Materials	0	0	12	0	12
43	Establishing Opns Parameters	0	0	9	2	11
17	Workshops/Institutes	3	4	3	0	10

APPENDIX 2

(Continued)

Output Cluster Category		Project Focus				Output Totals (20)
Set DE Coding	Events	Res (5)	Dev (7)	Diff (5)	Eval (3)	
40	Acquiring Supplies/Facilities	2	3	5	0	10
31	Field Trials/Experiments	1	3	3	0	7
38	Training	0	1	2	4	7
51	Acquiring Funds	0	0	6	0	6
48	Maintaining Accountability	2	0	3	0	5
18	Presentations	1	0	2	1	4
19	Benchmark Decisions	2	0	1	1	4
50	Disseminating Info/Outputs	1	0	2	1	4
30	Committee/Consultant Meetings	0	1	1	1	3
15	Staff Meetings	1	0	0	1	2
16	Conferences/Seminars	0	1	1	0	2
39	Updating of Machine Systems	0	1	1	0	2
49	Establishing Field Sites	1	0	1	0	2
47	Coordinating Efforts	2	0	0	0	2
Totals		23	19	67	21	130

Output Cluster Category		Project Focus				Output Totals (20)
Set DE Coding	Conditions	Res (5)	Dev (7)	Diff (5)	Eval (3)	
21	Working Environment/Atmosphere	3	2	11	3	19
20	Cooperative Relationships	2	5	6	1	14
34	Coordinated Efforts	1	0	8	1	10
22	Quality Assurance	1	3	3	0	7
23	Accountability	2	2	1	1	6
25	Resource Accessibility	1	0	2	1	4
41	Effective Communication	1	1	2	0	4
44	Provision for Services	0	0	2	2	4
45	Informed Public	1	0	0	1	2
26	Available Field Sites	1	0	0	0	1
35	Acceptance/Adoption of Outputs	0	0	1	0	1
46	Trained Staff	0	1	0	0	1
Totals		13	14	36	10	73
Grand Totals		119	315	398	130	962

APPENDIX 3

Primary Categories of Outputs, Organized Within Cluster Categories, and the Number of Outputs Identified Within Them by Project Focus

Set DE FGHI Coding	Products	Project Focus Res (5)	Dev (7)	Diff (5)	Eval (3)	Total (20)
	OUTPUT CLUSTER					
01	Reports/Contracts	21	25	47	29	122
	PRIMARY OUTPUT CATEGORIES					
01 0158	Evaluation Report.	1	1	12	10	24
01 0006	Terminal Report.	6	3	4	3	16
01 0089	Status Condition Report.	1	2	5	6	14
01 0099	Progress Report.	4	5	3	1	13
01 0007	Proposal.	2	6	1	1	10
01 0040	Description of Program/Project.	1	3	3	2	9
01 0144	Financial Report.	1	0	6	0	7
01 0230	Technical Report.	3	0	1	2	6
01 0053	Abstracted Descript: Programs.	0	0	4	0	4
01 0146	Contracts for Services	0	0	3	0	3
01 0286	Survey Reports.	0	0	2	1	3
01 0261	Formative/Field Test Eval Data.	0	0	0	3	3
01 0216	Dissertations.	2	0	0	0	2
01 0274	Usage Report.	0	0	2	0	2
01 0068	Review Procedures, I-M Handling.	0	1	0	0	1
01 0071	Review of Design Report.	0	1	0	0	1
01 0090	Report of Operations Analysis.	0	1	0	0	1
01 0255	Interview Reports.	0	1	0	0	1
01 0278	Prospectus/Letters of Intent.	0	1	0	0	1
01 0047	A/V Descriptions of Programs.	0	0	1	0	1
	OUTPUT CLUSTER					
04	Work Specifications/Procedures	5	45	21	7	78

APPENDIX 3

(Continued)

Set DE FGHI Coding		Products	Project Focus				Total (20)
			Res (5)	Dev (7)	Diff (5)	Eval (3)	
		PRIMARY OUTPUT CATEGORIES					
04	0095	Description/Specs for Output.	0	7	0	0	7
04	0220	Data Analysis Procedures.	2	3	0	0	5
04	0017	Terminal Instr Objectives.	0	5	0	0	5
04	0222	Data Collection Procedures.	1	3	0	0	4
04	0154	Specifications for Personnel.	0	0	1	2	3
04	0197	Descr of Research Variables.	1	0	1	0	2
04	0074	Specs: Operation Requirements.	0	2	0	0	2
04	0076	Specs: I-M Handling Sub-Systems.	0	2	0	0	2
04	0091	Performance Specs: I-M Systems.	0	2	0	0	2
04	0092	Design Alternates for Evaluation.	0	2	0	0	2
04	0117	Program (within project) Plan.	0	1	0	1	2
04	0121	Script, Film.	0	1	1	0	2
04	0192	Specs: Data Gathering Instrmnt.	0	1	1	0	2
04	0232	Specs: Output Revisions.	0	2	0	0	2
04	0042	Selection Criteria: Sites etc.	0	0	1	1	2
04	0055	Report Specifications.	0	0	1	1	2
04	0150	Scripts for TV Program.	0	0	2	0	2
04	0209	Speech Texts.	0	0	2	0	2
04	0310	Script: Film/Tape Presentation.	0	0	2	0	2
04	0321	Content Outline Guides/Manuals.	1	0	0	0	1
04	0018	Enabling Instr Objectives.	0	1	0	0	1
04	0019	Content Outline, Instructional.	0	1	0	0	1
04	0065	Test Procedure, I-M Handling System.	0	1	0	0	1
04	0066	List of Project Products.	0	1	0	0	1
04	0067	Implementing Plan, I-M Handling.	0	1	0	0	1
04	0072	Specs: Hardware Requirements.	0	1	0	0	1
04	0073	Specs: Software Requirements.	0	1	0	0	1
04	0077	Specs: Automated I-M System.	0	1	0	0	1
04	0078	Major Task Descriptions.	0	1	0	0	1
04	0079	Cost Categories: Oper System.	0	1	0	0	1
04	00821	Interview Guide.	0	1	0	0	1
04	0085	Project Operational Plan.	0	1	0	0	1
04	0275	Project Objectives.	0	1	0	0	1
04	0280	Specs: Filming Techniques.	0	1	0	0	1
04	0029	Site Assessment Criteria.	0	0	1	0	1

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(Continued)

Set DE	Set FGHI Coding	Products	Project Focus				Total
			Res (5)	Dev (7)	Diff (5)	Eval (3)	(20)
04	0060	Validation Criteria for Data.	0	0	1	0	1
04	0118	Formulated Policy.	0	0	1	0	1
04	0133	Serialized TV Adventure Script.	0	0	1	0	1
04	0136	Curriculum for Reading Program.	0	0	1	0	1
04	0151	Curriculum for Ed TV Program.	0	0	1	0	1
04	0153	Specifications for Facilities.	0	0	1	0	1
04	0186	Specs: Free Product Dtbg Sites.	0	0	1	0	1
04	0198	Sight Vocabulary List.	0	0	1	0	1
04	0013	Project Time Line/Schedule.	0	0	0	1	1
04	0293	Review/Refinement Procedures.	0	0	0	1	1
		OUTPUT CLUSTER					
27		Data (including printouts)	10	26	25	14	75
		PRIMARY OUTPUT CATEGORIES					
27	0044	Interview Data/Information.	0	1	1	3	5
27	0169	Diffusion Impact Data.	0	3	2	0	5
27	0188	Normative Data.	0	0	2	3	5
27	0235	Baseline Data.	3	2	0	0	5
27	0001	Prototype Tryout Data.	1	3	0	0	4
27	0185	Needs Identification Data.	0	2	1	1	4
27	0199	Item Analysis Data.	0	2	2	0	4
27	0038	Research Data.	1	1	1	0	3
27	0190	Product Review/Critique.	0	3	0	0	3
27	0195	Social Interaction Data.	1	0	1	1	3
27	0244	Coded Data.	1	0	2	0	3
27	0267	Indexes.	0	0	3	0	3
27	0033	Learner Data File.	0	1	1	0	2
27	0087	List of Potential Output Users.	0	2	0	0	2
27	0194	Learner Achievement Data	1	0	1	0	2
27	0245	Computer Printouts	2	0	0	0	2
27	0260	Summative Evaluation Data.	0	0	1	1	2
27	0261	Formative/Field Test Eval Data.	0	2	0	0	2
27	0289	Directories.	0	0	0	2	2
27	0290	Census Data.	0	0	0	2	2

APPENDIX 3

(Continued)

Set Coding DE	Set Coding FGHI	Products	Project Focus Res (5)	Project Focus Dev (7)	Project Focus Diff (5)	Project Focus Eval (3)	Total (20)
27	0047	A/V Descriptions of Programs.	0	0	1	0	1
27	0064	Cost Estimates.	0	1	0	0	1
27	0069	Design Review Data, I-M system	0	1	0	0	1
27	0088	List of User Needs.	0	1	0	0	1
27	0095	Description/Specs for Output.	0	1	0	0	1
27	0168	Demographic Data.	0	0	1	0	1
27	0170	Community Resource Data.	0	0	1	0	1
27	0171	Pre-school Guide Activity Data.	0	0	1	0	1
27	0189	Data on Product Appeal.	0	0	1	0	1
27	0211	Handling Sys: Project Outputs.	0	0	1	0	1
27	0231	List: Acquisition/Data.	0	0	1	0	1
27	0286	Survey Reports.	0	0	0	1	1

OUTPUT CLUSTER

Set Coding DE	Set Coding FGHI	Products	Res (5)	Dev (7)	Diff (5)	Eval (3)	Total (20)
02		Data Instruments/Techniques	20	22	18	14	74

PRIMARY OUTPUT CATEGORIES

Set Coding DE	Set Coding FGHI	Products	Res (5)	Dev (7)	Diff (5)	Eval (3)	Total (20)
02	0187	Descriptive Data Tests, Subject.	14	1	3	1	19
02	0082	Questionnaire.	2	5	6	2	15
02	0061	Observation System.	1	1	2	5	9
02	0217	Observation Record Form.	0	4	2	0	6
02	0224	Attitude Meas, Cognitive Value.	0	3	0	2	5
02	0031	Criterion-Based Test Item Pool.	0	3	0	0	3
02	0081	Interview Guide.	0	3	0	0	3
02	0309	Worksheets: Proj Documentation.	0	0	3	0	3
02	0239	Compendium of Measures.	2	0	0	0	2
02	0049	Progress Check Test.	0	1	0	1	2
02	0242	Data Handling Codes.	0	0	0	2	2
02	0220	Data Analysis Procedures.	1	0	0	0	1
02	0106	Cumulative Post Test.	0	1	0	0	1
02	0181	Interagency Opns Control Form.	0	0	1	0	1
02	0308	Data-Handling Cards.	0	0	1	0	1
02	0096	Evaluation Checklist.	0	0	0	1	1

APPENDIX 3

(Continued)

Set DE FGHI Coding		Products	Project Focus				Total
			Res (5)	Dev (7)	Diff (5)	Eval (3)	(20)
		OUTPUT CLUSTER					
08		Plans/Designs/Theories/Models	8	44	14	7	73
		PRIMARY OUTPUT CATEGORIES					
08	0218	Quality Control Schema.	0	12	0	0	12
08	0256	Field Test Plan.	0	5	4	0	9
08	0281	Evaluation Plan/Design.	0	4	1	1	6
08	0002	Research Design.	3	1	0	1	5
08	0117	Program (within project) Plan.	0	0	2	3	5
08	0226	Rationale for Objvs and Msmt.	0	4	0	0	4
08	0067	Implementing Plan, I-M Handling.	0	2	1	0	3
08	0085	Project Operational Plan.	0	3	0	0	3
08	0279	Conceptual Framework.	0	2	1	0	3
08	0238	Model of Content Discipline.	2	0	0	0	2
08	0240	Working Papers.	1	1	0	0	2
08	0053	Abstracted Descript: Programs.	0	2	0	0	2
08	0118	Formulated Policy.	0	0	2	0	2
08	0222	Data Collection Procedures.	0	0	2	0	2
08	0237	Model of Skills Acquisition.	1	0	0	0	1
08	0334	Theory Papers.	1	0	0	0	1
08	0019	Content Outline, Instructional.	0	1	0	0	1
08	0030	Materials Presentation Design.	0	1	0	0	1
08	0036	Model: Developing Instr Units.	0	1	0	0	1
08	0070	Design for I-M Handling System.	0	1	0	0	1
08	0093	Design Concepts, I-M System.	0	1	0	0	1
08	0208	Plans: Future Project Dvlpmnt.	0	1	0	0	1
08	0225	Rationale for Data Instrument.	0	1	0	0	1
08	0257	Conference/Workshop Agenda.	0	1	0	0	1
08	0062	Team Rotation Plan.	0	0	1	0	1
08	0220	Data Analysis Procedures.	0	0	0	1	1
08	0259	Evaluation Model.	0	0	0	1	1

APPENDIX 3

(Continued)

Set DE	FGHI Coding	Products	Project Focus Res (5)	Dev (7)	Diff (5)	Eval (3)	Total (20)
		OUTPUT CLUSTER					
05		Work Management Systems	7	20	23	12	62
		PRIMARY OUTPUT CATEGORIES					
05	0013	Project Time Line/Schedule.	4	6	7	2	19
05	0324	Budget Allocations.	1	3	2	1	7
05	0145	Intraagency Opns Control Form.	1	0	3	0	4
05	0083	PERT Chart.	0	3	0	0	3
05	0211	Handling Sys: Project Outputs.	0	0	3	0	3
05	0218	Quality Control Schema.	0	2	0	0	2
05	0282	Memos/Directives/Bulletins.	0	1	0	1	2
05	0269	Correspondence.	0	0	2	0	2
05	0329	Work Assignment Record.	0	0	2	0	2
05	0033	Learner Data File.	0	0	0	2	2
05	0016	Advisory Committee.	1	0	0	0	1
05	0067	Implementing Plan, I-M Handling.	0	1	0	0	1
05	0094	Automated I-M Handling System.	0	1	0	0	1
05	0281	Evaluation Plan/Design.	0	1	0	0	1
05	0326	Reporting Procedures.	0	1	0	0	1
05	0327	Coordination/Liaison Procedure.	0	1	0	0	1
05	0040	Description of Program/Project.	0	0	1	0	1
05	0045	Site Visitation Schedule.	0	0	1	0	1
05	0115	Project Products Dstrb System.	0	0	1	0	1
05	0184	Mailing Lists.	0	0	1	0	1
05	0285	Organizational Chart.	0	0	0	1	1
05	0288	Task/Time Allotments.	0	0	0	1	1
05	0291	Management Information Center.	0	0	0	1	1
05	0292	Mediated Data Display.	0	0	0	1	1
05	0294	Operations Progress Chart.	0	0	0	1	1
05	0297	Feedback System Classroom Mgmt.	0	0	0	1	1

APPENDIX 3

(Continued)

Set DE	FGHI Coding	Products	Project Focus				Total
			Res (5)	Dev (7)	Diff (5)	Eval (3)	(20)
		OUTPUT CLUSTER					
03		Guides/Manuals	3	18	29	6	56
		PRIMARY OUTPUT CATEGORIES					
03	0164	Diffusion Manual/Guidelines.	0	0	7	0	7
03	0034	Instructional Unit Use Guide.	1	4	1	0	6
03	0108	Supplementary Instr Materials.	0	4	0	0	4
03	0055	Report Specifications.	0	0	2	2	4
03	0081	Interview Guide.	2	0	0	1	3
03	0095	Description/Specs for Output.	0	1	2	0	3
03	0138	Story Boards.	0	1	1	0	2
03	0249	Staff Development Trng Unit.	0	2	0	0	2
03	0149	Ref Index: Film for TV Program.	0	0	2	0	2
03	0155	Info/Idea Notebook for Writers.	0	0	2	0	2
03	0075	Manual for I-M Handling System.	0	1	0	0	1
03	0078	Major Task Descriptions.	0	1	0	0	1
03	0096	Evaluation Checklist.	0	1	0	0	1
03	[illegible]	Content Map for Instr. Course.	0	1	0	0	1
03	0217	Observation Record Form.	0	1	0	0	1
03	0281	Evaluation Plan/Design.	0	1	0	0	1
03	0002	Research Design.	0	0	1	0	1
03	0035	Parent Instr Unit Use Guide.	0	0	1	0	1
03	0041	Site Visit Checklist.	0	0	1	0	1
03	0042	Selection Criteria: Sites etc.	0	0	1	0	1
03	0043	Guidelines for Site Visits.	0	0	1	0	1
03	0134	Serialized Story Manuscript.	0	0	1	0	1
03	0137	Ref Manual: Instr in Reading.	0	0	1	0	1
03	0175	Pre-sch Lrng Activities, Parent.	0	0	1	0	1
03	0253	Curriculum Dvlpmnt Guidelines.	0	0	1	0	1
03	0267	Indexes.	0	0	1	0	1
03	0270	Computer Program Documentation.	0	0	1	0	1
03	0307	Use Guide for Card Sort System.	0	0	1	0	1
03	0029	Site Assessment Criteria.	0	0	0	1	1
03	0222	Data Collection Procedures.	0	0	0	1	1
03	0301	PPBS Manual.	0	0	0	1	1

APPENDIX 3

(Continued)

Set DE	FGHI Coding	Products	Project Focus Res (5)	Dev (7)	Diff (5)	Eval (3)	Total (20)
		OUTPUT CLUSTER					
10		Publications	4	6	36	6	52
		PRIMARY OUTPUT CATEGORIES					
10	0266	Journal.	0	0	7	0	7
10	0201	Professional Report/Monograph.	2	2	1	1	6
10	0203	Learning Activity Books.	0	0	6	0	6
10	0097	Journal Article, Published.	2	2	1	0	5
10	0135	Television Program Magazine.	0	0	5	0	5
10	0332	Magazine/Newspaper Articles.	0	0	3	0	3
10	0040	Description of Program/Project.	0	0	2	0	2
10	0139	Non-fiction Books (commercial).	0	0	2	0	2
10	0159	Project Newsletter.	0	0	1	1	2
10	0267	Indexes.	0	0	2	0	2
10	0252	Information Brochures.	0	0	0	2	2
10	0286	Survey Reports.	0	0	0	2	2
10	0227	Compendium: Instr Objvs/Meas.	0	1	0	0	1
10	0276	Articles: House Publications.	0	1	0	0	1
10	0053	Abstracted Descript: Programs.	0	0	1	0	1
10	0183	List of Resource Personnel.	0	0	1	0	1
10	0251	School Paper.	0	0	1	0	1
10	0268	Microform Copy.	0	0	1	0	1
10	0272	Publication Proof Copy.	0	0	1	0	1
10	0273	Publications (not identified).	0	0	1	0	1
		OUTPUT CLUSTER					
07		Resource Lists	2	31	11	0	44
		PRIMARY OUTPUT CATEGORIES					
07	0227	Compendium: Instr Objvs/Meas	0	13	0	0	13

APPENDIX 3

(Continued)

Set DE	Coding FGHI	Products	Project Focus				Total (20)
			Res (5)	Dev (7)	Diff (5)	Eval (3)	
07	0046	List of Field Settings.	1	4	4	0	9
07	0228	Compendium: Instr Objectives	0	4	0	0	4
07	0040	Description of Program/Project.	0	0	2	0	2
07	0183	List of Resource Personnel.	0	1	1	0	2
07	0003	Microformed Bibliographies.	1	0	0	0	1
07	0031	Criterion-Based Test Item Pool.	0	1	0	0	1
07	0032	Norm-Referenced Test Items.	0	1	0	0	1
07	0086	Bibliographies.	0	1	0	0	1
07	0095	Description/Specs for Output.	0	1	0	0	1
07	0221	Source List for Objectives	0	1	0	0	1
07	0224	Attitude Meas, Cognitive Value	0	1	0	0	1
07	0229	Attitude Measure, Tolerance	0	1	0	0	1
07	0231	List: Acquisition/Data	0	1	0	0	1
07	0306	Clearinghouse: RDD&E Outputs.	0	1	0	0	1
07	0167	Community Resource Directory.	0	0	1	0	1
07	0182	List: Distrib Agencies/Points.	0	0	1	0	1
07	0202	Catalog of Available Products.	0	0	1	0	1
07	0289	Directories.	0	0	1	0	1
		OUTPUT CLUSTER					
14		Instructnl Units/Use w/Staff	2	4	30	3	39
		PRIMARY OUTPUT CATEGORIES					
14	0249	Staff Development Trng Unit.	0	0	12	0	12
14	0250	Pupil Svc Personnel Trng Unit.	0	0	10	0	10
14	0160	Training Film for Educators.	0	0	3	2	5
14	0303	Computer Instr in Computer Use.	0	3	0	0	3
14	0320	Trng Program in Group Dynamics.	2	0	0	0	2
14	0304	Computer Simulation: Operation.	0	1	0	0	1
14	0039	Interview Training Procedures.	0	0	1	0	1
14	0161	Diffusion Staff Trng Program.	0	0	1	0	1
14	0162	Demo of Follow-Up to A-V Learning.	0	0	1	0	1
14	0163	Training Film for Parents.	0	0	1	0	1
14	0177	Trng Program for Lay Personnel.	0	0	1	0	1
14	0024	Audio Tape Instr Modules.	0	0	0	1	1

APPENDIX 3

(Continued)

Set Coding DE	FGHI	Products	Project Focus Res (5)	Dev (7)	Diff (5)	Eval (3)	Total (20)
		OUTPUT CLUSTER					
12		Instructnl Units/In-School	0	26	3	0	29
		PRIMARY OUTPUT CATEGORIES					
12	0026	Computer Asst/Ext Instr Units.	0	2	0	0	2
12	0104	Instructional Package, Medium.	0	2	0	0	2
12	0105	Instructional Package, Small.	0	2	0	0	2
12	0108	Supplementary Instr Materials.	0	2	0	0	2
12	0236	Single Concept Learning Unit.	0	2	0	0	2
12	0020	Syndactic Text Instr Materials.	0	1	0	0	1
12	0021	Remedial Units for Syndactic Texts.	0	1	0	0	1
12	0022	Single-Concept Instr Films.	0	1	0	0	1
12	0023	Video Tape Instr Modules.	0	1	0	0	1
12	0024	Audio Tape Instr Modules.	0	1	0	0	1
12	0025	Activities Outline: Instr Units.	0	1	0	0	1
12	0027	Linear Programmed Instr Text.	0	1	0	0	1
12	0028	Intrinsically Programmed Text.	0	1	0	0	1
12	0037	Computer-Based Instr Unit.	0	1	0	0	1
12	0050	Structural Communication Unit.	0	1	0	0	1
12	0052	Panel Book Visuals: Audio Tape.	0	1	0	0	1
12	0107	Master Tutor Instr Unit.	0	1	0	0	1
12	0128	Multimedia Leadership Course.	0	1	0	0	1
12	0157	Sound Track: A-V Presentation.	0	1	0	0	1
12	0180	Pilot Instr Program (movie).	0	1	0	0	1
12	0303	Computer Instr in Computer Use.	0	1	0	0	1
12	0172	Pre-sch Lrng Matter Teacher Use.	0	0	1	0	1
12	0174	Pre-sch Lrng Activities, Tchr.	0	0	1	0	1
12	0205	Pre-school Text Books.	0	0	1	0	1
		OUTPUT CLUSTER					
13		Instructnl Units/Extra-School	0	0	18	0	18

APPENDIX 3

(Continued)

Set Coding		Products	Project Focus				Total (20)
DE	FGHI		Res (5)	Dev (7)	Diff (5)	Eval (3)	
		PRIMARY OUTPUT CATEGORIES					
13	0129	Television Program.	0	0	2	0	2
13	0131	Live Action Film: Reading Prog.	0	0	2	0	2
13	0132	Video Tape, TV Prog Component.	0	0	2	0	2
13	0152	Video Tapes, completed TV Program.	0	0	2	0	2
13	0024	Audio Tape Instr Modules.	0	0	1	0	1
13	0052	Panel Book Visuals: Audio Tape.	0	0	1	0	1
13	0130	Animated Film: Reading Program.	0	0	1	0	1
13	0147	Live-Action Film for TV Show.	0	0	1	0	1
13	0148	Animated Film for TV Show.	0	0	1	0	1
13	0157	Sound Track: A-V Presentation.	0	0	1	0	1
13	0173	Pre-sch Lrng Matter Parent Use.	0	0	1	0	1
13	0175	Pre-sch Lrng Activities, Parent.	0	0	1	0	1
13	0180	Pilot Instr Program (movie).	0	0	1	0	1
13	0215	Learning Kit, commercial.	0	0	1	0	1
		OUTPUT CLUSTER					
11		Promotional Materials	0	1	16	0	17
		PRIMARY OUTPUT CATEGORIES					
11	0140	Promotional Phonograph Records.	0	0	5	0	5
11	0204	Learning Activity Toys/Games.	0	0	3	0	3
11	0252	Information Brochures.	0	0	3	0	3
11	0305	Project Promo Presentation Pkg.	0	1	1	0	2
11	0125	Promotional Film.	0	0	1	0	1
11	0141	Film Strip Promotional Unit.	0	0	1	0	1
11	0206	Educational Greeting Cards.	0	0	1	0	1
11	0212	Educational Calendar.	0	0	1	0	1
		OUTPUT CLUSTER					
28		Taxonomies	0	5	0	0	5

APPENDIX 3

(Continued)

Set DE	FGHI Coding	Products	Project Focus Res (5)	Dev (7)	Diff (5)	Eval (3)	Total (20)
		PRIMARY OUTPUT CATEGORIES					
28	0223	Taxonomy for Learner Outcomes.	0	5	0	0	5
		OUTPUT CLUSTER					
29		Recommendations	0	4	0	0	4
		PRIMARY OUTPUT CATEGORIES					
29	0095	Description/Specs for Output.	0	2	0	0	2
29	0233	Curriculum Recommendations.	0	2	0	0	2
		OUTPUT CLUSTER					
36		Curricular Objectives	0	3	0	0	3
		PRIMARY OUTPUT CATEGORIES					
36	0219	Student Performance Objectives.	0	2	0	0	2
36	0228	Compendium: Instr Objectives.	0	1	0	0	1
		OUTPUT CLUSTER					
37		Critiques	0	2	1	0	3
		PRIMARY OUTPUT CATEGORIES					
37	0190	Product Review/Critique.	0	1	1	0	2
37	0201	Professional Report/Monograph.	0	1	0	0	1

APPENDIX 3

(Continued)

Set DE FGHI Coding		Products	Project Focus				Total (20)
			Res (5)	Dev (7)	Diff (5)	Eval (3)	
		OUTPUT CLUSTER					
06		Data Management Systems	1	0	1	0	2
		PRIMARY OUTPUT CATEGORIES					
06	0220	Data Analysis Procedures.	1	0	0	0	1
06	0270	Computer Program Documentation.	0	0	1	0	1
		OUTPUT CLUSTER					
09		Equipment/Tools/Facilities	0	0	2	0	2
		PRIMARY OUTPUT CATEGORIES					
09	0213	Children's Activity Center.	0	0	1	0	1
09	0214	Satellite Management Center.	0	0	1	0	1
		OUTPUT CLUSTER					
42		Prediction Variables	0	0	0	1	1
		PRIMARY OUTPUT CATEGORIES					
42	0287	Key Indicators: Condition School.	0	0	0	1	1

APPENDIX 3

(Continued)

Set DE	FGHI Coding	Events	Project Focus				Total (20)
			Res (5)	Dev (7)	Diff (5)	Eval (3)	
		OUTPUT CLUSTER					
32		Recruiting/Placing Staff	3	3	10	5	21
		PRIMARY OUTPUT CATEGORIES					
32	0241	Selecting Personnel.	1	2	9	4	16
32	0012	Assigning Work.	2	1	1	1	5
		OUTPUT CLUSTER					
33		Collecting/Analyzing Data.	4	2	5	5	16
		PRIMARY OUTPUT CATEGORIES					
33	0246	Interpreting Data Analysis.	2	0	1	2	5
33	0265	Collecting Data.	0	0	0	3	3
33	0243	Interviewing.	1	0	0	0	1
33	0333	Surveying the Literature.	1	0	0	0	1
33	0103	Acquiring Course Materials.	0	1	0	0	1
33	0234	Reviewing Status/Quality.	0	1	0	0	1
33	0156	Pre-use Critique: A-V Program.	0	0	1	0	1
33	0311	Surveying by Telephone.	0	0	1	0	1
33	0312	Surveying Costs.	0	0	1	0	1
33	0314	Coding Data.	0	0	1	0	1
		OUTPUT CLUSTER					
52		Adapting Materials	0	0	12	0	12
		PRIMARY OUTPUT CATEGORIES					
52	0335	Revising Existing Materials.	0	0	12	0	12

APPENDIX 3

(Continued)

Set		Events	Project Focus				Total (20)
DE Coding	FGHI Coding		Res (5)	Dev (7)	Diff (5)	Eval (3)	
		OUTPUT CLUSTER					
43		Establishing Opns Parameters	0	0	9	2	11
		PRIMARY OUTPUT CATEGORIES					
43	0015	Making Management Decisions.	0	0	5	0	5
43	0296	Planning Proj Opns/Guidelines.	0	0	1	2	3
43	0331	Expanding Product Availability.	0	0	2	0	2
43	0323	Making Policy Decisions.	0	0	1	0	1
		OUTPUT CLUSTER					
17		Workshops/Institutes	3	4	3	0	10
		PRIMARY OUTPUT CATEGORIES					
17	0176	Training Workshop/Conference.	3	0	3	0	6
17	0258	Development (work) Conference.	0	2	0	0	2
17	0098	Info Dissemination Workshop.	0	1	0	0	1
17	0284	Staff Retreat.	0	1	0	0	1
		OUTPUT CLUSTER					
40		Acquiring Supplies/Facilities	2	3	5	0	10
		PRIMARY OUTPUT CATEGORIES					
40	0165	Acquiring Facilities.	0	1	3	0	4
40	0008	Evaluating Hardware.	1	0	0	0	1
40	0011	Acquiring Microform Hardware.	1	0	0	0	1
40	0277	Acquiring of Filming Equipment	0	1	0	0	1
40	0325	Acquiring Operational Supplies.	0	1	0	0	1

APPENDIX 3

(Continued)

Set DE	FGHI Coding	Events	Project Focus Res (5)	Dev (7)	Diff (5)	Eval (3)	Total (20)
40	0143	Acquiring TV Studio Hardware.	0	0	1	0	1
40	0178	Acquiring Television Sets.	0	0	1	0	1
		OUTPUT CLUSTER					
31		Field Trials/Experiments	1	3	3	0	7
		PRIMARY OUTPUT CATEGORIES					
31	0114	Field Tests.	1	2	3	0	6
31	0328	Conducting Experiments.	0	1	0	0	1
		OUTPUT CLUSTER					
38		Training	0	1	2	4	7
		PRIMARY OUTPUT CATEGORIES					
38	0191	RDD&E on the Job Training.	0	1	2	2	5
38	0176	Training Workshop/Conference.	0	0	0	2	2
		OUTPUT CLUSTER					
51		Acquiring Funds	0	0	6	0	6
		PRIMARY OUTPUT CATEGORIES					
51	0120	Acquiring Funds.	0	0	6	0	6

APPENDIX 3

(Continued)

Set DE FGHI Coding		Events	Project Focus Res (5)	 Dev (7)	 Diff (5)	 Eval (3)	Total (20)
		OUTPUT CLUSTER					
48		Maintaining Accountability	2	0	3	0	5
		PRIMARY OUTPUT CATEGORIES					
48	0317	Maintaining Project Progress.	1	0	2	0	3
48	0318	Maintaining Fiscal Acctability.	1	0	1	0	2
		OUTPUT CLUSTER					
18		Presentations	1	0	2	1	4
		PRIMARY OUTPUT CATEGORIES					
18	0119	Speeches.	1	0	2	1	4
		OUTPUT CLUSTER					
50		Disseminating Info/Outputs	1	0	2	1	4
		PRIMARY OUTPUT CATEGORIES					
50	0014	Disseminating Information.	1	0	2	1	4
		OUTPUT CLUSTER					
19		Benchmark Decisions	2	0	1	1	4

APPENDIX 3

(Continued)

Set DE	FGHI Coding	Events	Project Focus				Total (20)
			Res (5)	Dev (7)	Diff (5)	Eval (3)	
		PRIMARY OUTPUT CATEGORIES					
19	0015	Making Management Decisions.	1	0	1	0	2
19	0323	Making Policy Decisions.	1	0	0	0	1
19	0262	Selecting of Performance Items.	0	0	0	1	1
		OUTPUT CLUSTER					
30		Committee/Consultant Meetings	0	1	1	1	3
		PRIMARY OUTPUT CATEGORIES					
30	0234	Reviewing Status/Quality.	0	1	0	1	2
30	0264	Staff Meetings.	0	0	1	0	1
		OUTPUT CLUSTER					
15		Staff Meetings	1	0	0	1	2
		PRIMARY OUTPUT CATEGORIES					
15	0264	Staff Meetings.	1	0	0	1	2
		OUTPUT CLUSTER					
16		Conferences/Seminars	0	1	1	0	2
		PRIMARY OUTPUT CATEGORIES					
16	0176	Training Workshop/Conference.	0	1	0	0	1
16	0200	Policy Setting Seminars.	0	0	1	0	1

APPENDIX 3

(Continued)

Set			Project Focus				
DE	FGHI Coding	Events	Res (5)	Dev (7)	Diff (5)	Eval (3)	Total (20)
		OUTPUT CLUSTER					
39		Updating of Machine Systems	0	1	1	0	2
		PRIMARY OUTPUT CATEGORIES					
39	0271	Modifying Systems.	0	1	1	0	2
		OUTPUT CLUSTER					
47		Coordinating Efforts	2	0	0	0	2
		PRIMARY OUTPUT CATEGORIES					
47	0316	Coordinating Data Collection.	2	0	0	0	2
		OUTPUT CLUSTER					
49		Establishing Field Sites	1	0	1	0	2
		PRIMARY OUTPUT CATEGORIES					
49	0322	Negotiating Participation/Coop.	1	0	0	0	1
49	0313	Selecting Field Test Sample.	0	0	1	0	1

APPENDIX 3

(Continued)

Set DE	FGHI Coding	Conditions	Project Focus Res (5)	Dev (7)	Diff (5)	Eval (3)	Total (20)
		OUTPUT CLUSTER					
21		Working Environment/Atmosphere	3	2	11	3	19
		PRIMARY OUTPUT CATEGORIES					
21	0010	Adequate Staff.	1	0	4	1	6
21	0100	Staff Welfare.	1	1	2	1	5
21	0109	Staff Morale.	0	1	2	0	3
21	0247	Adequate Facilities/Equipment.	1	0	0	0	1
21	0054	Staff Awareness/Acceptance.	0	0	1	0	1
21	0057	Decision Making Structure.	0	0	1	0	1
21	0124	Atmosphere: Feeling Effective.	0	0	1	0	1
21	0295	Healthy Atmosphere: Criticism.	0	0	0	1	1
		OUTPUT CLUSTER					
20		Cooperative Relationships	2	5	6	1	14
		PRIMARY OUTPUT CATEGORIES					
20	0101	Intra/Inter Agency Relations.	0	1	2	0	3
20	0057	Decision Making Structure.	0	1	0	1	2
20	0111	Inter/Intra Agency Cooperation.	0	2	0	0	2
20	0207	Project Management Structure.	0	1	1	0	2
20	0126	Relationship with TV Networks.	0	0	2	0	2
20	0113	Site Personnel Welfare.	1	0	0	0	1
20	0319	Adequate Community Interface.	1	0	0	0	1
20	0254	Community/Parent Involvement.	0	0	1	0	1
		OUTPUT CLUSTER					
34		Coordinated Efforts	1	0	8	1	10

APPENDIX 3

(Continued)

Set Coding DE	Set Coding FGHI	Conditions	Project Focus Res (5)	Project Focus Dev (7)	Project Focus Diff (5)	Project Focus Eval (3)	Total (20)
		PRIMARY OUTPUT CATEGORIES					
34	0193	Intra-agency Coordination.	1	0	3	0	4
34	0084	Inter-agency Coordination.	0	0	1	1	2
34	0059	Operations Efficiency, Project.	0	0	1	0	1
34	0116	Managed Production Personnel.	0	0	1	0	1
34	0315	Project Leadership.	0	0	1	0	1
34	0336	Coordinated/Compatible Outputs.	0	0	1	0	1
		OUTPUT CLUSTER					
22		Quality Assurance	1	3	3	0	7
		PRIMARY OUTPUT CATEGORIES					
22	0058	Quality Output.	1	1	2	0	4
22	0127	Adherence to Project Philosophy.	0	1	1	0	2
22	0263	Monitored Project Operations.	0	1	0	0	1
		OUTPUT CLUSTER					
23		Accountability	2	2	1	1	6
		PRIMARY OUTPUT CATEGORIES					
23	0009	Managed Money Resources.	2	1	0	0	3
23	0112	Project Accountability.	0	1	0	0	1
23	0056	Compatible Work/Expense Rates.	0	0	1	0	1
23	0263	Monitored Project Operations.	0	0	0	1	1

APPENDIX 3

(Continued)

Set DE Coding	FGHI	Conditions	Project Focus				Total
			Res (5)	Dev (7)	Diff (5)	Eval (3)	(20)
		OUTPUT CLUSTER					
25		Resource Accessibility	1	0	2	1	4
		PRIMARY OUTPUT CATEGORIES					
25	0247	Adequate Facilities/Equipment.	1	0	1	0	2
25	0330	Adequate Support Linkages.	0	0	1	0	1
25	0298	Maintained Program Operations.	0	0	0	1	1
		OUTPUT CLUSTER					
41		Effective Communication	1	1	2	0	4
		PRIMARY OUTPUT CATEGORIES					
41	0196	Effective Communications.	1	0	1	0	2
41	0283	Adequate Information Flow.	0	1	0	0	1
41	0166	Facilitated Product Distrib.	0	0	1	0	1
		OUTPUT CLUSTER					
44		Provision for Services	0	0	2	2	4
		PRIMARY OUTPUT CATEGORIES					
44	0179	Consulting Services.	0	0	2	0	2
44	0299	Test Construction Service.	0	0	0	1	1
44	0300	Measurement Service.	0	0	0	1	1

APPENDIX 3

(Continued)

Set DE	FGHI Coding	Conditions	Project Focus				Total
			Res (5)	Dev (7)	Diff (5)	Eval (3)	(20)
		OUTPUT CLUSTER					
45		Informed Public	1	0	0	1	2
		PRIMARY OUTPUT CATEGORIES					
45	0004	Project Publicity.	1	0	0	0	1
45	0302	Informed Public.	0	0	0	1	1
		OUTPUT CLUSTER					
26		Available Field Sites	1	0	0	0	1
		PRIMARY OUTPUT CATEGORIES					
26	0005	Adequate Field Setting.	1	0	0	0	1
		OUTPUT CLUSTER					
35		Acceptance/Adoption of Outputs.	0	0	1	0	1
		PRIMARY OUTPUT CATEGORIES					
35	0054	Staff Awareness/Acceptance.	0	0	1	0	1
		OUTPUT CLUSTER					
46		Trained Staff	0	1	0	0	1

APPENDIX 3

(Continued)

Set DE FGHI Coding		Conditions	Project Focus				Total (20)
			Res (5)	Dev (7)	Diff (5)	Eval (3)	
		PRIMARY OUTPUT CATEGORIES					
46	0010	Adequate Staff.	0	1	0	0	1

APPENDIX 4

Primary Categories of Outputs, Organized Within Cluster Categories, and the Number of Outputs Analyzed Within Them by Project Focus

Set		Products	Project Focus				Total
DE	FGHI		Res	Dev	Diff	Eval	
Coding			(5)	(7)	(5)	(3)	(20)
		CLUSTER CATEGORY					
01		Reports/Contracts	6	6	9	5	26
		PRIMARY CATEGORIES					
01	0099	Progress Report.	1	3	1	0	5
01	0158	Evaluation Report.	0	0	2	3	5
01	0040	Description of Program/Project.	1	1	2	0	4
01	0007	Proposal.	1	2	0	0	3
01	0144	Financial Report.	1	0	2	0	3
01	0006	Terminal Report.	2	0	0	0	2
01	0053	Abstract Program Descriptions	0	0	2	0	2
01	0089	Status Condition Report.	0	0	0	1	1
01	0230	Technical Report.	0	0	0	1	1
		CLUSTER CATEGORY					
08		Plans/Designs/Theories/Models	4	17	2	3	26
		PRIMARY CATEGORIES					
08	0002	Research Design.	3	1	0	1	5
08	0218	Quality Control Schema.	0	5	0	0	5
08	0226	Rationale For Objvs and Msmt.	0	2	0	0	2
08	0281	Evaluation Plan/Design.	0	1	0	1	2
08	0039	Materials Presentation Design.	0	1	0	0	1
08	0036	Model: Developing Instr Units.	0	1	0	0	1
08	0067	Implementing Plan, I-M Handling.	0	1	0	0	1
08	0085	Project Operational Plan.	0	1	0	0	1
08	0117	Program (w/in project) Plan.	0	0	1	0	1
08	0208	Plans: Future Project Dvmt.	0	1	0	0	1

APPENDIX 4

(Continued)

Set Coding DE	FGHI	Products	Project Focus Res (5)	Dev (7)	Diff (5)	Eval (3)	Total (20)
08	0225	Rationale for Data Instrument.	0	1	0	0	1
08	0240	Working Papers.	0	1	0	0	1
08	0019	Content Outline, Instructional	0	1	0	0	1
08	0256	Field Test Plan.	0	0	1	0	1
08	0259	Evaluation Model.	0	0	0	1	1
08	0334	Theory Papers.	1	0	0	0	1
		CLUSTER CATEGORY					
04		Work Specifications/Procedures	2	13	5	1	21
		PRIMARY CATEGORIES					
04	0095	Description/Specs for Output.	0	3	0	0	3
04	0220	Data Analysis Procedures.	1	2	0	0	3
04	0017	Terminal Instr Objectives.	0	2	0	0	2
04	0209	Speech Texts.	0	0	2	0	2
04	0222	Data Collection Procedures.	1	1	0	0	2
04	0018	Quality Control Schema.	0	1	0	0	1
04	0019	Student Performance Objectives.	0	1	0	0	1
04	0042	Selection Criteria: Sites etc.	0	0	0	1	1
04	0055	Report Specifications.	0	0	1	0	1
04	0076	Specs: I-M Handling Sub-systems.	0	1	0	0	1
04	009[illegible]	Performance Specs: I-M System.	0	1	0	0	1
04	0121	Script, Film.	0	0	1	0	1
04	0136	Curriculum for Reading Program.	0	0	1	0	1
04	0192	Specs: Data Gathering Instrmnt.	0	1	0	0	1
		CLUSTER CATEGORY					
02		Data Instruments/Techniques	6	7	2	5	20

APPENDIX 4

(Continued)

Set		Products	Project Focus				Total
DE	FGHI Coding		Res (5)	Dev (7)	Diff (5)	Eval (3)	(20)
		PRIMARY CATEGORIES					
02	0082	Questionnaire.	1	2	1	1	5
02	0187	Descriptive Data Tests, Subject.	2	0	1	1	4
02	0061	Observation System.	1	0	0	2	3
02	0224	Attitude Meas, Cognitive Value.	0	2	0	0	2
02	0031	Criterion-Based Test Item Pool.	0	1	0	0	1
02	0049	Progress Check Test.	0	1	0	0	1
02	0081	Interview Guide.	0	1	0	0	1
02	0220	Data Analysis Procedures.	1	0	0	0	1
02	0239	Compendium of Measures.	1	0	0	0	1
02	0242	Data Handling Codes.	0	0	0	1	1
		CLUSTER CATEGORY					
05		Work Management Systems	4	5	7	2	18
		PRIMARY CATEGORIES					
05	0013	Project Time Line/Schedule.	3	0	1	0	4
05	0324	Budget Allocations.	0	2	1	0	3
05	0016	Advisory Committee.	1	0	0	0	1
05	0033	Learner Data File.	0	0	0	1	1
05	0040	Description of Program/Project.	0	0	1	0	1
05	0083	PERT Chart.	0	1	0	0	1
05	0094	Automated I-M Handling System.	0	1	0	0	1
05	0115	Project Products Dstrb System.	0	0	1	0	1
05	0211	Handling Sys: Project Outputs.	0	0	1	0	1
05	0218	Quality Control Schema.	0	1	0	0	1
05	0269	Correspondence.	0	0	1	0	1
05	0297	Feedback System Classroom Mgmt.	0	0	0	1	1
05	0329	Work Assignment Record.	0	0	1	0	1

APPENDIX 4

(Continued)

Set Coding DE	Set Coding FGHI	Products	Project Focus Res (5)	Dev (7)	Diff (5)	Eval (3)	Total (20)
		CLUSTER CATEGORY					
07		Resource Lists	1	8	4	0	13
		PRIMARY CATEGORIES					
07	0040	Description of Program/Project.	0	0	2	0	2
07	0227	Compendium: Instr Objvs/Meas.	0	2	0	0	2
07	0228	Compendium: Instr Objectives.	0	2	0	0	2
07	0003	Microformed Bibliographies.	1	0	0	0	1
07	0046	List of Field Settings.	0	0	1	0	1
07	0086	Bibliographies.	0	1	0	0	1
07	0183	List of Resource Personnel.	0	1	0	0	1
07	0221	Source List for Objectives.	0	1	0	0	1
07	0289	Directories.	0	0	1	0	1
07	0306	Clearinghouse: RDD&E Outputs.	0	1	0	0	1
		CLUSTER CATEGORY					
12		Instructnl Units/In-School	0	13	0	0	13
		PRIMARY CATEGORIES					
12	0020	Syndactic Text Instr Materials.	0	1	0	0	1
12	0022	Single-Concept Instr Films.	0	1	0	0	1
12	0023	Video Tape Instr Modules.	0	1	0	0	1
12	0024	Audio Tape Instr Modules.	0	1	0	0	1
12	0026	Computer Asst/Ext Instr Units.	0	1	0	0	1
12	0027	Linear Programmed Instr Text.	0	1	0	0	1
12	0028	Intrinsically Porgrammed Text.	0	1	0	0	1
12	0037	Computer-Based Instr Unit.	0	1	0	0	1
12	0050	Structural Communication Unit.	0	1	0	0	1
12	0104	Instructional Package, Medium.	0	1	0	0	1
12	0107	Master Tutor Instr Unit.	0	1	0	0	1
12	0236	Single Concept Learning Unit.	0	1	0	0	1
12	0303	Computer Instr in Computer Use.	0	1	0	0	1

APPENDIX 4

(Continued)

Set DE	FGHI Coding	Products	Project Focus Res (5)	Dev (7)	Diff (5)	Eval (3)	Total (20)
		CLUSTER CATEGORY					
27		Data (including printouts)	2	8	1	2	13
		PRIMARY CATEGORIES					
27	0001	Prototype Tryout Data.	1	1	0	0	2
27	0044	Interview Data/Information.	0	1	0	1	2
27	0199	Item Analysis Data.	0	2	0	0	2
27	0033	Learner Data File.	0	1	0	0	1
27	0038	Research Data.	0	0	1	0	1
27	0064	Cost Estimates.	0	1	0	0	1
27	0169	Design Review Data, I-M System.	0	1	0	0	1
27	0190	Product Review/Critique.	0	1	0	0	1
27	0235	Baseline Data.	1	0	0	0	1
27	0260	Summative Evaluation Data.	0	0	0	1	1
		CLUSTER CATEGORY					
03		Guides/Manuals	0	4	3	2	9
		PRIMARY CATEGORIES					
03	0029	Site Assessment Criteria.	0	0	0	1	1
03	0034	Instructional Unit Use Guide.	0	1	0	0	1
03	0055	Report Specifications.	0	0	1	0	1
03	0081	Interview Guide.	0	0	0	1	1
03	0110	Content Map for Instr Course.	0	1	0	0	1
03	0138	Story Boards.	0	1	0	0	1
03	0155	Info/Idea Notebook for Writers.	0	0	1	0	1
03	0249	Staff Development Trng Unit.	0	1	0	0	1
03	0267	Indexes.	0	0	1	0	1

APPENDIX 4

(Continued)

Set DE	FGHI Coding	Products	Project Focus Res (5)	Dev (7)	Diff (5)	Eval (3)	Total (20)
		CLUSTER CATEGORY					
10		Publications	0	2	5	0	7
		PRIMARY CATEGORIES					
10	0332	Magazine/Newspaper Articles.	0	0	3	0	3
10	0053	Abstracted Descript: Programs.	0	0	1	0	1
10	0097	Journal Article, Published.	0	1	0	0	1
10	0266	Journal.	0	0	1	0	1
10	0227	Compendium: Instr Objvs/Meas.	0	1	0	0	1
		CLUSTER CATEGORY					
14		Instructnl Units/Use w/Staff	0	3	2	0	5
		PRIMARY CATEGORIES					
14	0303	Computer Instr in Computer Use.	0	2	0	0	2
14	0304	Computer Simulation: Operation.	0	1	0	0	1
14	0039	Interview Training Procedures.	0	0	1	0	1
14	0249	Staff Development Trng Unit.	0	0	1	0	1
		CLUSTER CATEGORY					
13		Instructnl Units/Extra-School	0	0	3	0	3
		PRIMARY CATEGORIES					
13	0129	Television Program.	0	0	1	0	1
13	0147	Live-Action Film for TV Show.	0	0	1	0	1
13	0157	Sound Track: A-V Presentation.	0	0	1	0	1

APPENDIX 4

(Continued)

Set DE FGHI Coding		Products	Project Focus Res (5)	 Dev (7)	 Diff (5)	 Eval (3)	Total (20)
		CLUSTER CATEGORY					
06		Data Management Systems	1	0	1	0	2
		PRIMARY CATEGORIES					
06	0220	Data Analysis Procedures.	1	0	0	0	1
06	0270	Computer Program Documentation.	0	0	1	0	1
		CLUSTER CATEGORY					
28		Taxonomies	0	2	0	0	2
		PRIMARY CATEGORIES					
28	0223	Taxonomy for Learner Outcomes.	0	2	0	0	2
		CLUSTER CATEGORY					
11		Promotional Materials	0	0	1	0	1
		PRIMARY CATEGORIES					
11	0125	Promotional Film.	0	0	1	0	1
		CLUSTER CATEGORY					
37		Critiques	0	1	0	0	1
		PRIMARY CATEGORIES					
37	0201	Professional Report/Monograph.	0	1	0	0	1

APPENDIX 4

(Continued)

Set DE	FGHI Coding	Products	Project Focus				Total (20)
			Res (5)	Dev (7)	Diff (5)	Eval (3)	
		CLUSTER CATEGORY					
42		Prediction Variables	0	0	0	1	1
		PRIMARY CATEGORIES					
42	0287	Key Indicators: Condition School.	0	0	0	1	1

APPENDIX 4

(Continued)

Set Coding		Events	Project Focus				Total
DE	FGHI		Res (5)	Dev (7)	Diff (5)	Eval (3)	(20)
		CLUSTER CATEGORY					
32		Recruiting/Placing Staff	2	3	8	1	14
		PRIMARY CATEGORIES					
32	0241	Selecting Personnel.	1	2	7	1	11
32	0012	Assigning Work.	1	1	1	0	3
		CLUSTER CATEGORY					
43		Establishing Opns Parameters	0	0	9	2	11
		PRIMARY CATEGORIES					
43	0015	Making Management Decisions.	0	0	5	0	5
43	0296	Planning Proj Opns/Guidelines.	0	0	1	2	3
43	0331	Expanding Product Availability.	0	0	2	0	2
43	0323	Making Policy Decisions.	0	0	1	0	1
		CLUSTER CATEGORY					
51		Acquiring Funds	0	0	5	0	5
		PRIMARY CATEGORIES					
51	0120	Acquiring Funds.	0	0	5	0	5
		CLUSTER CATEGORY					
33		Collecting/Analyzing Data	1	0	1	2	4

APPENDIX 4

(Continued)

Set DE	Coding FGHI	Events	Project Focus Res (5)	 Dev (7)	 Diff (5)	 Eval (3)	Total (20)
		PRIMARY CATEGORIES					
33	0243	Interviewing.	1	0	0	0	1
33	0156	Pre-use Critique: A-V Program.	0	0	1	0	1
33	0246	Interpreting Data Analysis.	0	0	0	1	1
33	0265	Collecting Data.	0	0	0	1	1
		CLUSTER CATEGORY					
48		Maintaining Accountability	2	0	2	0	4
		PRIMARY CATEGORIES					
48	0317	Maintaining Project Progress.	1	0	1	0	2
48	0318	Maintaining Fiscal Acctability.	1	0	1	0	2
		CLUSTER CATEGORY					
50		Disseminating Info/Outputs	1	0	2	1	4
		PRIMARY CATEGORIES					
50	0014	Disseminating Information.	1	0	2	1	4
		CLUSTER CATEGORY					
52		Adapting Materials	0	0	4	0	4
		PRIMARY CATEGORIES					
52	0335	Revising Existing Materials.	0	0	4	0	4

APPENDIX 4

(Continued)

Set Coding		Events	Project Focus				Total (20)
DE	FGHI		Res (5)	Dev (7)	Diff (5)	Eval (3)	
		CLUSTER CATEGORY					
17		Workshops/Institutes	1	2	0	0	3
		PRIMARY CATEGORIES					
17	0176	Training Workshop/Conference.	1	0	0	0	1
17	0258	Development (work) Conference.	0	1	0	0	1
17	0284	Staff Retreat.	0	1	0	0	1
		CLUSTER CATEGORY					
38		Training	0	1	1	1	3
		PRIMARY CATEGORIES					
38	0191	RDD&E on the Job Training.	0	1	1	1	3
		CLUSTER CATEGORY					
40		Acquiring Supplies/Facilities	2	0	1	0	3
		PRIMARY CATEGORIES					
40	0008	Evaluating Hardware.	1	0	0	0	1
40	0011	Acquiring Microform Hardware.	1	0	0	0	1
40	0165	Acquiring Facilities.	0	0	1	0	1
		CLUSTER CATEGORY					
19		Benchmark Decisions	1	0	1	0	2

APPENDIX 4

(Continued)

Set DE	FGHI Coding	Events	Project Focus Res (5)	Dev (7)	Diff (5)	Eval (3)	Total (20)
		PRIMARY CATEGORIES					
19	0015	Making Management Decisions.	1	0	1	0	2
		CLUSTER CATEGORY					
31		Field Trials/Experiments	1	1	0	0	2
		PRIMARY CATEGORIES					
31	0114	Field Tests.	1	1	0	0	2
		CLUSTER CATEGORY					
39		Updating of Machine Systems	0	1	1	0	2
		PRIMARY CATEGORIES					
39	0271	Modifying Systems.	0	1	1	0	2
		CLUSTER CATEGORY					
16		Conferences/Seminars	0	1	0	0	1
		PRIMARY CATEGORIES					
16	0176	Training Workshop/Conference.	0	1	0	0	1

APPENDIX 4

(Continued)

Set DE	Coding FGHI	Events	Project Focus Res (5)	 Dev (7)	 Diff (5)	 Eval (3)	Total (20)
		CLUSTER CATEGORY					
18		Presentations	0	0	1	0	1
		PRIMARY CATEGORIES					
18	0119	Speeches.	0	0	1	0	1
		CLUSTER CATEGORY					
30		Committee/Consultant Mettings	0	0	1	0	1
		PRIMARY CATEGORIES					
30	0264	Staff Meetings.	0	0	1	0	1
		CLUSTER CATEGORY					
47		Coordinating Efforts	1	0	0	0	1
		PRIMARY CATEGORIES					
47	0316	Coordinating Data Collection.	1	0	0	0	1

APPENDIX 4

(Continued)

Set DE FGHI Coding		Conditions	Project Focus Res (5)	 Dev (7)	 Diff (5)	 Eval (3)	Total (20)
		CLUSTER CATEGORY					
21		Working Environment/Atmosphere	1	2	9	2	14
		PRIMARY CATEGORY					
21	0010	Adequate Staff.	1	0	3	1	5
21	0100	Staff Welfare.	0	1	2	0	3
21	0109	Staff Morale.	0	1	2	0	3
21	0054	Staff Awareness/Acceptance.	0	0	1	0	1
21	0124	Atmosphere: Feeling Effective.	0	0	1	0	1
21	0295	Healthy Atmosphere: Criticism.	0	0	0	1	1
		CLUSTER CATEGORY					
20		Cooperative Relationships	1	5	6	0	12
		PRIMARY CATEGORIES					
20	0101	Intra/Inter Agency Relations.	0	1	2	0	3
20	0111	Inter/Intra Agency Cooperation.	0	2	0	0	2
20	0207	Project Management Structure.	0	1	1	0	2
20	0126	Relationship with TV Networks.	0	0	2	0	2
20	0113	Site Personnel Welfare.	1	0	0	0	1
20	0057	Decision Making Structure.	0	1	0	0	1
20	0254	Community/Parent Involvement.	0	0	1	0	1
		CLUSTER CATEGORY					
22		Quality Assurance	0	2	3	0	5

APPENDIX 4

(Continued)

Set Coding DE	Set Coding FGHI	Conditions	Project Focus Res (5)	Project Focus Dev (7)	Project Focus Diff (5)	Project Focus Eval (3)	Total (20)
		PRIMARY CATEGORIES					
22	0058	Quality Output.	0	1	2	0	3
22	0263	Monitored Project Operations.	0	1	0	0	1
22	0127	Adherence to Project Philosophy.	0	0	1	0	1
		CLUSTER CATEGORY					
23		Accountability	2	2	1	0	5
		PRIMARY CATEGORIES					
23	0009	Managed Money Resources.	2	1	0	0	3
23	0112	Project Accountability.	0	1	0	0	1
23	0056	Compatible Work/Expense Rates.	0	0	1	0	1
		CLUSTER CATEGORY					
34		Coordinated Efforts	0	0	4	1	5
		PRIMARY CATEGORIES					
34	0059	Operations Efficiency, Project.	0	0	1	0	1
34	0116	Managed Production Personnel.	0	0	1	0	1
34	0315	Project Leadership.	0	0	1	0	1
34	0336	Coordinated/Compatible Outputs.	0	0	1	0	1
34	0084	Interagency Coordination.	0	0	0	1	1
		CLUSTER CATEGORY					
44		Provision for Services	0	0	1	2	3

APPENDIX 4

(Continued)

Set		Conditions	Project Focus				Total
DE	FGHI Coding		Res (5)	Dev (7)	Diff (5)	Eval (3)	(20)
		PRIMARY CATEGORIES					
44	0179	Consulting Services.	0	0	1	0	1
44	0299	Test Construction Service.	0	0	0	1	1
44	0300	Measurement Service.	0	0	0	1	1
		CLUSTER CATEGORY					
25		Resource Accessibility	0	0	0	1	1
		PRIMARY CATEGORIES					
25	0298	Maintained Program Operations.	0	0	0	1	1
		CLUSTER CATEGORY					
26		Available Field Sites	1	0	0	0	1
		PRIMARY CATEGORIES					
26	0005	Adequate Field Setting.	1	0	0	0	1
		CLUSTER CATEGORY					
35		Acceptance/Adoption of Outputs	0	0	1	0	1
		PRIMARY CATEGORIES					
35	0054	Staff Awareness/Acceptance.	0	0	1	0	1

APPENDIX 4

(Continued)

Set Coding DE	Set Coding FGHI	Conditions	Project Focus Res (5)	Dev (7)	Diff (5)	Eval (3)	Total (20)
		CLUSTER CATEGORY					
41		Effective Communication	0	1	0	0	1
		PRIMARY CATEGORIES					
41	0283	Adequate Information Flow.	0	1	0	0	1
		CLUSTER CATEGORY					
45		Informed Public	1	0	0	0	1
		PRIMARY CATEGORIES					
45	0004	Project Publicity.	1	0	0	0	1
		CLUSTER CATEGORY					
46		Trained Staff	0	1	0	0	1
		PRIMARY CATEGORIES					
46	0010	Adequate Staff.	0	1	0	0	1

APPENDIX 5

Primary Categories of Standards, and the Number of Standards Statements Coded Within Them by Project Focus

Primary Standard Category		Project Focus				
Set LM Coding	Output Standards	Res (5)	Dev (7)	Diff (5)	Eval (3)	Totals (20)
12	Goal attainment	18	35	31	18	102
13	Acceptance by others (in proj)	10	38	14	15	77
01	Completeness of content	10	29	18	3	60
06	Acceptance by users	0	19	35	3	57
05	Utility or value	1	28	19	7	55
07	Personal satisfaction/feeling	8	28	9	2	47
04	Communication and clarity	4	27	8	5	44
09	Lack of errors/discrepancies	3	23	7	7	40
22	Functions as planned	6	14	8	7	35
11	Appropriate design/content	1	12	10	10	33
16	Compares favorably	4	16	2	6	28
14	Acceptance by sponsor	2	13	7	2	24
08	Agreement/concurrence w/others	2	12	4	3	21
18	Satisfactory appearance	5	7	3	1	16
19	Logical criteria	3	9	2	1	15
21	Sources of variance controlled	3	3	2	7	15
17	Internally consistent	2	10	2	0	14
15	Compliance w/sponser guideline	1	3	9	0	13
30	Lack of negative feedback	1	6	3	1	11
23	Successfully constrains/guides	0	6	2	2	10
24	Terminology appropriate	2	5	1	2	10
25	Awareness that outputs exist	0	0	9	0	9
02	Quantity of outputs/data	1	0	4	2	7
28	Operable by others	0	5	2	0	7
20	Performs consistently	2	2	1	0	5
26	Components are complementary	0	3	2	0	5
32	Created by reputable producer	0	3	0	1	4
10	Obvious (direct) termination	3	0	0	0	3
29	Meets design expectations	1	0	1	1	3
03	Quantity of effort expended	0	1	0	1	2
27	Good physical repair/quality	0	0	1	0	1
31	Meets legal constraints	0	1	0	0	1
33	Inclusions are representative	0	0	1	0	1
Totals		93	358	217	107	775

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APPENDIX 5

(Continued)

Primary Standard Category		Project Focus				
Set LM Coding	Process Standards	Res (5)	Dev (7)	Diff (5)	Eval (3)	Totals (20)
34	Impact of effort favorable	3	5	16	10	34
17	External enthusiasm evident	6	4	20	2	32
04	Deadlines are met	5	9	9	6	29
13	Work conducted w/in budget	2	7	18	1	28
36	Employment criteria met	1	6	17	0	24
15	Tasks perceived and acted upon	0	2	16	0	18
05	Acceptable level of output	3	6	3	3	15
26	Values and objectives match	2	4	9	0	15
24	Costs acceptable for benefits	0	5	7	0	12
07	An expected activity occurs	3	1	3	4	11
14	No felt deficiencies	1	5	5	0	11
20	Performance respected	1	4	4	2	11
11	Costs consistent w/estimates	3	4	3	0	10
16	External cooperation gained	2	4	3	1	10
01	Personnel cooperate	3	1	4	1	9
02	Personnel are satisfied	0	4	4	1	9
25	Staff reflect trust	0	2	3	2	7
12	No obvious omissions	1	0	2	3	6
28	Closure reached on questions	0	2	2	2	6
32	Resources available on request	0	0	1	5	6
35	Output distributed/requested	0	0	2	4	6
09	Outside contributions accepted	2	3	0	0	5
18	Desired personnel obtained	1	1	2	1	5
33	Personal growth/productivity	0	0	4	1	5
03	Minimum correction required	0	0	3	1	4
10	Maximum possible participation	2	1	1	0	4
30	Personnel loss not excessive	1	0	3	0	4
41	Guidelines are followed	0	1	2	1	4
08	Staff contributions accepted	0	2	1	0	3
21	Follow-on proposals are funded	0	2	1	0	3
22	Feedback occurs	0	2	1	0	3
27	Decisions result in action	0	2	1	0	3
29	Creativity in work evidenced	0	0	3	0	3
31	Overtime worked voluntarily	0	1	2	0	3
06	Work structure is efficient	0	0	2	0	2

APPENDIX 5

(Continued)

Primary Standard Category		Project Focus				
Set LM Coding	Process Standards	Res (5)	Dev (7)	Diff (5)	Eval (3)	Totals (20)
23	Project view accepted	0	2	0	0	2
42	Revision yields improvement	0	2	0	0	2
19	Adequate reputation w/sponsor	0	1	0	0	1
37	Staff adaptive to situations	0	0	1	0	1
38	Equity in opportunity to input	1	0	0	0	1
39	Evidence of pre-planning	0	0	1	0	1
40	Output published externally	0	0	0	1	1
43	Policy constraints minimal	0	0	0	1	1
44	Responsibility taken willingly	0	0	1	0	1
45	Resources used efficiently	0	0	1	0	1
46	Staff are self-directing	0	0	1	0	1
Totals		43	95	182	53	373
Grand Totals		136	453	399	160	1148

APPENDIX 6

Primary Categories of Tasks, Organized Within Cluster Categories, and the Number of Task Statements Coded Within Them by Project Focus

Set NO	QR Coding	Tasks	Project Focus Res (5)	Dev (7)	Diff (5)	Eval (3)	Totals (20)
		TASK CLUSTER					
04		Producing the output	43	175	158	98	474
		PRIMARY TASK CATEGORIES					
04	02	Construct/assemble components of output.	17	97	75	36	225
04	05	Produce output.	7	31	29	10	77
04	13	Construct/employ production tools/aids.	5	10	17	10	42
04	01	Construct/assemble measurement tools.	5	7	10	14	36
04	14	Adapt materials for local/specific use.	1	4	9	8	22
04	08	Select/produce data processing/handling.	2	1	3	8	14
04	04	Secure/select required materials/comps.	2	7	2	2	13
04	07	Package output.	2	3	1	2	8
04	15	Copy output for other media applications.	0	8	0	0	8
04	12	Invent new production method/instrument.	0	2	4	0	6
04	16	Coach talent(filming, video, sound).	0	1	4	0	5
04	18	Provide materials to producers.	0	0	3	2	5
04	09	Translate outcomes/content to user terms.	0	1	0	3	4
04	17	Organize presentation components.	0	3	1	0	4
04	19	Adapt content into processing format.	0	0	0	3	3
04	11	Get permission to use copyright material.	2	0	0	0	2
		TASK CLUSTER					
05		Collecting/processing data	71	106	102	63	342
		PRIMARY TASK CATEGORIES					
05	02	Administer/implement data instruments.	12	22	37	8	79

APPENDIX 6

(Continued)

Set NO	QR Coding	Tasks	Project Focus Res (5)	Dev (7)	Diff (5)	Eval (3)	Totals (20)
05	03	Record/score/classify/code raw data.	8	21	17	11	57
05	09	Interpret data.	10	11	18	11	50
05	11	Try out output/component for operability.	8	14	13	5	40
05	06	Perform analyses as specified/indicated.	8	14	5	6	33
05	01	Conduct/operate program to be measured.	3	10	5	0	18
05	04	Transfer raw data into storage form.	3	4	5	4	16
05	07	Compile computational data.	0	5	1	6	12
05	05	Translate data into processing form	5	1	0	5	11
05	08	Prepare supporting documentation.	4	3	0	2	9
05	14	Specify parameters of sub-routines.	3	0	0	1	4
05	12	Specify job control lang for computer.	3	0	0	0	3
05	18	Construct/maintain data displays	0	0	0	3	3
05	10	Acquire artifacts.	0	1	1	0	2
05	13	Identify sub-routines req by computer.	1	0	0	0	1
05	15	Sequence the computer program.	1	0	0	0	1
05	16	Determine constants inherent in analysis.	1	0	0	0	1
05	17	Specify format for computer printout.	1	0	0	0	1
05	19	Specify/identify data identity codes.	0	0	0	1	1

TASK CLUSTER

06		Assessing the output quality	32	178	91	35	336

PRIMARY TASK CATEGORIES

06	14	Note/make advisable modification(s).	7	90	47	14	158
06	15	Proofread/edit written material.	2	26	9	8	45
06	01	Check output against specifications.	6	22	13	1	42
06	08	Determine inadequate output components.	6	13	7	1	27
06	07	Judge output effectiveness/consistency.	1	3	7	0	11
06	06	Judge output operability/acceptability.	3	3	2	1	9
06	10	Confirm operability/validity of tools.	0	4	0	5	9
06	11	Judge effectiveness of data gathering	1	3	2	1	7
06	02	Judge significance of performance result.	4	1	0	0	5
06	19	Edit video-audio-film materials.	0	3	2	0	5

APPENDIX 6

(Continued)

Set NO	QR Coding	Tasks	Project Focus				Totals
			Res (5)	Dev (7)	Diff (5)	Eval (3)	(20)
06	05	Identify unexpected/incongruent outcomes	0	2	1	1	4
06	12	Relate data to decision situations.	0	3	0	1	4
06	16	Determine adeq of implementation process.	2	2	0	0	4
06	17	Check recommended changes specs.	0	2	0	0	2
06	20	Select best alternative method/procedure.	0	0	0	2	2
06	03	Determine achievement of objectives.	0	0	1	0	1
06	18	Judge output against personal standards.	0	1	0	0	1
		TASK CLUSTER					
22		Effecting accountability	44	102	120	48	314
		PRIMARY TASK CATEGORIES					
22	04	Establish/maintain time lines.	9	17	7	13	46
22	02	Delegate responsibilities/authority.	7	12	18	2	39
22	12	Explicate procedures/strategies/duties.	2	5	19	1	27
22	14	Issue production orders.	2	15	3	3	23
22	13	Interact with advisory services.	1	7	13	0	21
22	05	Project cost estimates.	2	11	4	3	20
22	07	Negotiate/renegotiate funding/objectives.	3	2	3	7	15
22	09	Monitor expenditure of time/svcs/money.	6	4	5	0	15
22	10	Report status as required/appropriate.	0	3	10	1	14
22	19	Maintain materials/use/fiscal records.	3	3	4	4	14
22	03	Determine/verify/monitor budget balances.	1	3	5	0	9
22	11	Explicate obj/outputs to be produced.	1	3	4	1	9
22	15	Prepare detailed spending plan.	0	4	4	0	8
22	08	Approve disbursement of funds.	4	2	1	0	7
22	18	Insure optimal use of resources.	0	0	4	2	6
22	21	Develop record keeping system.	1	1	3	1	6
22	17	Maintain duplicate records/files.	0	1	3	1	5
22	01	Specify accountability procedures.	0	1	2	1	4
22	22	Estimate/provide material/personnel.	1	0	1	1	3
22	28	Specify/establish/adopt policies.	0	1	0	2	3

APPENDIX 6

(Continued)

Set NO	QR Coding	Tasks	Project Focus				Totals (20)
			Res (5)	Dev (7)	Diff (5)	Eval (3)	
22	29	Oversee/monitor adherence to requiremts.	0	2	0	1	3
22	06	Determine nature/content of reporting.	1	1	0	0	2
22	16	Compare expenditure rate with plan	0	1	1	0	2
22	20	Develop/maintain inventory system.	0	0	2	0	2
22	25	Pay bills/collect payments.	0	1	1	0	2
22	26	Divide work into appropriate segments.	0	0	1	1	2
22	27	Monitor/determine cost-effectiveness.	0	0	2	0	2
22	23	Direct/request special reports.	0	1	0	0	1
22	24	Determine/comply w/sponsor's procedures.	0	1	0	0	1
22	30	Obtain staff input regarding time/funds.	0	0	0	1	1
22	31	Participate in production efforts as req.	0	0	0	1	1
22	32	Approve budget.	0	0	0	1	1

TASK CLUSTER

03		Designing the output	30	118	88	64	300

PRIMARY TASK CATEGORIES

03	10	Specify/identify character of materials.	4	43	21	9	77
03	06	Specify treatments/procedures/strategies.	6	11	15	7	39
03	09	Visualize/specify format/appearance.	2	13	10	3	28
03	03	Determine relation of variables/compnts.	4	14	1	6	25
03	08	Translate objectives/data into meaning.	0	3	18	0	21
03	05	Specify/select grouping/sampling.	3	2	1	12	18
03	04	Select/specify populations(s) involved.	2	1	8	2	13
03	12	Estab tolerances/effectiveness criteria.	0	5	4	3	12
03	23	Consider/design alternative approaches.	0	3	4	4	11
03	20	State overall design.	1	5	3	0	9
03	07	Conceptualize output application	3	4	0	1	8
03	01	Identify decision situations of interest.	0	2	0	5	7
03	02	Isolate contaminating variables.	2	1	1	3	7
03	18	Specify data/info processing/up-date.	1	2	0	4	7
03	13	Establish specs for output try-out/demo	0	5	0	0	5

APPENDIX 6

(Continued)

Set NO	QR Coding	Tasks	Project Focus Res (5)	Dev (7)	Diff (5)	Eval (3)	Totals (20)
03	17	Specify measures to be used.	0	3	1	1	5
03	19	Specify kind of data analysis to be used.	0	0	1	2	3
03	22	Specify data collection schedule.	0	1	0	2	3
03	15	Specify site adaptations required.	1	0	0	0	1
03	24	Visualize/Specify effect of output.	1	0	0	0	1

TASK CLUSTER

24		Effecting quality control	19	101	134	44	298

PRIMARY TASK CATEGORIES

24	11	Proof/critique products/performances	2	16	34	9	61
24	17	Direct/request critques from others.	4	32	11	2	49
24	10	Monitor progress/status of work.	3	4	22	7	36
24	09	Initiate/direct quality control action	3	6	17	7	33
24	07	Monitor personnel performance	3	8	8	5	24
24	06	Monitor adherence to output specs.	0	8	12	2	22
24	04	Specify/develop improvement procedures.	0	6	5	2	13
24	16	Negotiate quality issues with sponsor.	0	7	4	0	11
24	23	Confirm accuracy of data imputs/outputs.	1	0	0	7	8
24	14	Determine need for/present alternatives.	2	2	2	1	7
24	01	Specify/recommend criteria for output.	0	3	3	0	6
24	21	Adjust staff for operation compatibility.	0	0	4	0	4
24	22	Select outputs for further review.	0	2	2	0	4
24	20	Monitor philosophical consistency of opn.	0	0	3	0	3
24	08	Monitor training effectiveness.	0	1	0	1	2
24	12	Monitor adherence to policies.	0	1	0	1	2
24	13	Monitor decisions made.	1	0	1	0	2
24	15	Identify quality control issues.	0	0	2	0	2
24	18	Monitor staff awareness of responsbility.	0	2	0	0	2
24	19	Approve potential staff for employment.	0	0	2	0	2
24	24	Monitor/judge project impact.	0	1	1	0	2
24	03	Specify standards for trng effectiveness	0	1	0	0	1
24	05	Delegate quality control responsibility.	0	1	0	0	1
24	25	Elicit author approval re project changes.	0	0	1	0	1

APPENDIX 6

(Continued)

Set NO	QR Coding	Tasks	Project Focus				Totals (20)
			Res (5)	Dev (7)	Diff (5)	Eval (3)	
		TASK CLUSTER					
01		Clarifying Problem Addressed	32	124	105	36	297
		PRIMARY TASK CATEGORIES					
01	12	Review of/familiarization w/materials	12	42	44	12	110
01	01	Review problem-relevant literature/info.	7	30	7	4	48
01	11	Visualize application of technique/ideas.	0	7	17	3	27
01	02	Specify context/scope/limits of effort.	1	9	11	2	23
01	06	Observe relevant/related field opns.	0	3	12	0	15
01	07	Identify characteristics tgt population.	1	5	5	4	15
01	08	Determine problems to be addressed.	5	7	1	1	14
01	03	Specify variables to be studied.	4	1	1	5	11
01	13	Obtain literature relevant to problem.	0	5	2	0	7
01	04	Identify contaminating variables.	1	1	1	3	6
01	10	Determine priorities of problems.	0	2	3	1	6
01	15	Operationally define terms/variables.	0	5	0	1	6
01	09	Determine sensitive areas in tgt context.	1	1	1	0	3
01	14	Compare existing frameworks/procedures.	0	3	0	0	3
01	05	State major hypotheses/philos position.	0	2	0	0	2
01	16	Identify/assess divergent points of view.	0	1	0	0	1
		TASK CLUSTER					
29		Facilitating relationships	32	76	69	48	225
		PRIMARY TASK CATEGORIES					
29	14	Interact with setting to collaborate.	9	9	25	9	52
29	15	Interact w/setting to enhance.	8	5	19	11	43
29	16	Make materials/experiences available.	1	12	6	12	31
29	04	Interact w/setting to elicit cooperation.	5	9	5	5	24
29	05	Communicate behavior required of setting.	3	10	1	5	19

APPENDIX 6

(Continued)

Set NO QR Coding		Tasks	Project Focus				Totals (20)
			Res (5)	Dev (7)	Diff (5)	Eval (3)	
29	06	Explain/prepare rationale for proc to site.	1	11	1	0	13
29	10	Promote or maintain focus of effort.	0	5	3	3	11
29	13	Maintain contacts with field.	2	2	5	1	10
29	01	Monitor field setting views/concerns.	1	4	0	0	5
29	09	Adapt to accommodate differences.	0	3	1	0	4
29	07	Negotiate resolution of differences.	0	2	1	0	3
29	08	Locate/document sources of disagreement.	0	2	0	0	2
29	11	Translate language into understood terms.	0	1	1	0	2
29	12	Provide for alternate output treatment	0	1	1	0	2
29	02	Give visibility to cooperating people.	1	0	0	0	1
29	03	Give visibility to cooperating agencies.	1	0	0	0	1
29	17	Provide foreign language translations.	0	0	0	1	1
29	18	Endorsement/support for field personnel.	0	0	0	1	1
		TASK CLUSTER					
31		Diffusing info within project	34	61	78	32	205
		PRIMARY TASK CATEGORIES					
31	04	Lead/participate in task-oriented groups.	6	14	12	8	40
31	06	Receive and react to relevant input.	4	7	25	1	37
31	12	Refer problem to appropriate specialists.	3	5	9	2	19
31	01	Plan/conduct staff meetings/conferences	0	7	7	4	18
31	08	Communicate production guidelines.	0	6	11	1	18
31	09	Keep involved personnel informed generally.	2	8	4	4	18
31	03	Produce/circulate bulletins/memos/news.	5	5	1	3	14
31	02	Make formal presentations.	3	3	2	2	10
31	15	Advise technically within expertise.	2	1	0	6	9
31	05	Join in/lead info meetings/contacts.	5	1	2	0	8
31	11	Advise on admin concerns w/in expertise.	1	0	3	1	5
31	10	Communicate relevant experience info.	0	2	1	0	3
31	13	Record events (e.g., minutes, processes).	3	0	0	0	3
31	07	Communicate decisions made.	0	1	1	0	2
31	14	Serve in consulting capacity to project.	0	1	0	0	1

APPENDIX 6

(Continued)

Set NO QR Coding		Tasks	Project Focus Res (5)	Dev (7)	Diff (5)	Eval (3)	Totals (20)
		TASK CLUSTER					
21		Procuring professional staff	21	61	83	36	201
		PRIMARY TASK CATEGORIES					
21	11	Provide training as appropriate.	2	13	17	12	44
21	10	Select/hire/appoint personnel.	6	4	15	8	33
21	09	Interview/screen candidates.	1	11	16	4	32
21	08	Identify potential candidates.	0	11	4	2	17
21	01	Analyze work for competencies required.	4	4	4	3	15
21	12	Negotiate w/candidate to employ/partic.	3	6	3	1	13
21	03	Formulate job descriptions/qualif/salary.	2	2	5	0	9
21	07	Make vacancies known.	0	2	4	3	9
21	13	Determine manpower needs.	1	2	4	1	8
21	02	Determine competencies available.	0	1	4	2	7
21	15	Recommend personnel for employment.	0	1	2	0	3
21	17	Determine/assess best staffing pattern.	1	0	2	0	3
21	05	Determine need for other points of view.	0	2	0	0	2
21	06	Maintain list of replacement personnel.	0	1	0	0	1
21	14	Determine tasks to procure staff.	1	0	0	0	1
21	16	Obtain approval to hire.	0	1	0	0	1
21	18	Obtain/assess candidate's goals.	0	0	1	0	1
21	19	Review opns relative to existing staff.	0	0	1	0	1
21	20	Confer w/others re candidate selection.	0	0	1	0	1
		TASK CLUSTER					
23		Procuring systems/services	30	45	117	7	199
		PRIMARY TASK CATEGORIES					
23	05	Negotiate contract/coop w/sites/services.	7	22	63	3	95
23	03	Identify/study possible sites/services.	6	5	33	0	44
23	04	Select/obtain sites/facilities/services.	3	12	11	0	26
23	07	Arrange visitation/schedule as needed.	6	0	5	3	14
23	02	Determine facilities/field material req.	3	1	2	0	6

APPENDIX 6

(Continued)

Set NO QR Coding	Tasks	Project Focus				Totals
		Res (5)	Dev (7)	Diff (5)	Eval (3)	(20)
23 08	Make public service/material/site needs	2	2	1	0	5
23 01	Determine tasks/services to be performed.	2	1	1	0	4
23 09	Procure required tools/equipment.	1	2	1	0	4
23 06	Get permission to use copyright material.	0	0	0	1	1

TASK CLUSTER

02	Formulating objectives	15	67	35	23	140

PRIMARY TASK CATEGORIES

02 07	Confer with colleagues/others re objects.	11	35	16	15	77
02 02	Conceptualize the product and context.	2	14	8	3	27
02 06	Create objectives.	0	6	8	2	16
02 03	Formulate specific questions/hypotheses.	0	4	2	1	7
02 01	Conceptualize the theoretical framework.	1	5	0	0	6
02 05	State problem in context of theory.	1	3	0	1	5
02 04	Determine nature of msmt objectives.	0	0	1	1	2

TASK CLUSTER

25	Maintaining job satisfaction	0	18	98	8	124

PRIMARY TASK CATEGORIES

25 01	Specify/explain agency/project position.	0	2	63	4	69
25 02	Provide means for handling staff views.	0	5	7	1	13
25 09	Encourage optimal self-direction.	0	2	6	1	9
25 04	Counsel with/be supportive of personnel.	0	3	4	0	7
25 03	Recognize merit.	0	0	4	1	5
25 08	Reconcile differences of opinion.	0	1	3	0	4
25 05	Adjust tasks to fit interests/limits.	0	0	2	1	3

APPENDIX 6

(Continued)

Set NO	QR Coding	Tasks	Project Focus Res (5)	Dev (7)	Diff (5)	Eval (3)	Totals (20)
25	13	Provide for social activities	0	1	2	0	3
25	06	Recommend promotions/salary increases.	0	1	1	0	2
25	07	Encourage creativity.	0	0	2	0	2
25	10	Foster mutual respect.	0	0	2	0	2
25	11	Support staff in decisions they make.	0	1	1	0	2
25	12	Foster feelings of security in job.	0	1	0	0	1
25	14	Act on behalf of staff in agency matters.	0	1	0	0	1
25	15	Nurture staff feelings of importance.	0	0	1	0	1

TASK CLUSTER

Set NO	QR Coding	Tasks	Res (5)	Dev (7)	Diff (5)	Eval (3)	Totals (20)
33		Effecting decision mechanisms	11	11	33	12	67

PRIMARY TASK CATEGORIES

Set NO	QR Coding	Tasks	Res (5)	Dev (7)	Diff (5)	Eval (3)	Totals (20)
33	03	Make decisions.	9	8	9	9	35
33	07	Participate in decision-making process.	2	1	8	1	12
33	02	Specify kinds of decisions at each level.	0	0	3	2	5
33	10	Establish organizational structure.	0	0	4	0	4
33	06	Specify vehicles for decision-making.	0	0	3	0	3
33	08	Identify/specify sources of problems	0	0	3	0	3
33	11	Get partic in decisions-conceptualizing.	0	1	1	0	2
33	01	Specify/determine key decision points.	0	0	1	0	1
33	04	Specify who needs what kinds of info.	0	1	0	0	1
33	09	Request support for decisions made.	0	0	1	0	1

TASK CLUSTER

Set NO	QR Coding	Tasks	Res (5)	Dev (7)	Diff (5)	Eval (3)	Totals (20)
30		Effecting info flow patterns	4	18	29	10	61

PRIMARY TASK CATEGORIES

Set NO	QR Coding	Tasks	Res (5)	Dev (7)	Diff (5)	Eval (3)	Totals (20)
30	03	Insure that key decision points get info.	3	10	16	4	33
30	02	Determine/use information sources.	0	4	6	1	11
30	01	Define project information flow policies.	0	0	2	3	5
30	07	Explicate/employ ways of enhancing flow.	1	2	1	1	5

APPENDIX 6

(Continued)

Set NO QR Coding		Tasks	Project Focus				Totals (20)
			Res (5)	Dev (7)	Diff (5)	Eval (3)	
30	04	Provide communications equip/capability	0	1	1	1	3
30	06	Monitor information flow.	0	1	1	0	2
30	05	Define lines of communications.	0	0	1	0	1
30	08	Coordinate people interactions.	0	0	1	0	1
		TASK CLUSTER					
26		Facilitating growth of staff	3	7	26	11	47
		PRIMARY TASK CATEGORIES					
26	01	Provide for guidance within project.	3	7	13	7	30
26	02	Provide opportunities for growth.	0	0	5	1	6
26	05	Provide opportunities for exposure.	0	0	4	0	4
26	03	Provide incentive for quality work.	0	0	3	0	3
26	06	Specify ownership/authorship policies.	0	0	1	1	2
26	07	Encourage publication of important work.	0	0	0	2	2
		TASK CLUSTER					
32		Diffusing info beyond project	10	9	15	6	40
		PRIMARY TASK CATEGORIES					
32	04	Report project at agency/other meetings.	2	6	4	4	16
32	02	Prepare/disseminate promotional info.	2	1	2	0	5
32	07	Provide info to dissemination services.	2	0	2	0	4
32	01	Write professional papers.	3	0	0	0	3
32	08	Interact with others regarding promotion.	1	2	0	0	3
32	10	Insure appropriate visibility of project	0	0	2	1	3
32	06	Interact with dissemination servies.	0	0	2	0	2
32	03	Act as consultant.	0	0	1	0	1
32	09	Enlist community help in dissemination.	0	0	1	0	1
32	11	Approve articles/papers for publication.	0	0	0	1	1
32	12	Prepare project descriptive materials.	0	0	1	0	1

APPENDIX 6

(Continued)

Set NO QR Coding	Tasks	Project Focus				Totals
		Res (5)	Dev (7)	Diff (5)	Eval (3)	(20)
	TASK CLUSTER					
07	Diffusing the output	1	11	20	4	36
	PRIMARY TASK CATEGORIES					
07 17	Distribute output/component.	0	2	8	3	13
07 14	Negotiate user acceptance/use.	0	5	1	0	6
07 15	Provide for user training as required.	0	2	3	0	5
07 09	Prepare/write promotional materials	1	1	1	0	3
07 01	Study/describe characteristics of output.	0	1	0	1	2
07 12	Present/demonstrate output to user.	0	0	2	0	2
07 13	Negotiate for user try-out.	0	0	2	0	2
07 08	Negotiate for sale of copyrighted matter.	0	0	1	0	1
07 11	Disseminate promotional materials.	0	0	1	0	1
07 18	Maintain distribution lists.	0	0	1	0	1
	TASK CLUSTER					
27	Enhancing physical environment	0	0	8	0	8
	PRIMARY TASK CATEGORIES					
27 06	Optimize accessibility to equip/services	0	0	3	0	3
27 01	Provide optimal proximity of staff.	0	0	2	0	2
27 04	Provide meeting/relaxation facility.	0	0	2	0	2
27 03	Provide for privacy.	0	0	1	0	1

APPENDIX 6

(Continued)

Set NO QR Coding		Tasks	Project Focus				Totals (20)
			Res (5)	Dev (7)	Diff (5)	Eval (3)	
		TASK CLUSTER					
28		Maintaining equity among staff	1	1	2	2	6
		PRIMARY TASK CATEGORIES					
28	01	Set demands in keeping with competencies.	1	0	1	1	3
28	02	Determine excessive/low work loads.	0	1	1	0	2
28	03	Insure equity in application of rules.	0	0	0	1	1

APPENDIX 7

Primary Categories of Knowledge, and the Number of Knowledge Statements Coded Within Them by Project Focus

Set UV Coding	Enabling Knowledges	Project Focus				Totals
		Res (5)	Dev (7)	Diff (5)	Eval (3)	(20)
06	Project variables: external	29	38	81	9	157
03	Subjects related to RDD&E	38	34	22	50	144
04	Technical/professional topics	14	56	44	22	136
08	Project operation: specific	12	40	36	8	96
07	Project operation: general	7	22	19	5	53
05	Project focus topics, external	11	15	15	9	50
02	Subjects learned in courses	3	16	9	13	41
12	Resources: Personnel	4	22	7	5	38
24	Process implementation (proj)	3	6	17	11	37
22	Use of equipment/systems	3	12	9	6	30
01	Standard school subjects	0	16	8	2	26
09	Scheduling & organizing	2	9	13	1	25
11	Fiscal matters	6	5	4	4	19
10	Staff status/responsibilities	1	3	12	1	17
18	Staff competencies/interests	0	3	8	4	15
19	Technical terminology/language	0	5	7	1	13
23	Char's of target audience	4	5	0	4	13
17	Writing styles	1	8	0	1	10
16	Guidelines for reporting	1	2	4	1	8
25	Sources of info/materials	1	1	4	2	8
21	Management techniques	2	1	2	2	7
28	Group dyn/decision processes	0	1	3	2	6
27	Potential field settings	0	4	0	1	5
13	Resources: money	2	1	0	0	3
14	Resources: time	2	0	0	0	2
26	Incorrect data entries/posting	2	0	0	0	2
20	Sponsor concerns	0	0	1	0	1
29	Need for material/info	0	0	1	0	1
30	Errors in strategies/judgment	0	0	0	1	1
Totals		148	325	326	165	964

APPENDIX 8

Primary Categories of Skills, and the Number of Skill Statements Coded Within Them by Project Focus

Set UV Coding	Enabling Skills	Project Focus				Totals
		Res (5)	Dev (7)	Diff (5)	Eval (3)	(20)
14	Writing	12	35	32	11	90
02	Facilitating people interactions	7	26	28	13	74
18	Finding fits/integrating	8	30	18	8	64
19	Planning/conceptualizing	6	19	11	9	45
11	Disciplining self	5	17	7	9	38
10	Analytical data handling	7	6	13	8	34
23	Persuading/justifying	4	7	19	3	33
05	Programming project events	3	12	9	6	30
01	Teaching	4	11	9	3	27
17	Interpreting language	3	12	7	5	27
25	Applying measurement tools	2	5	12	7	26
27	Using equipment/systems	3	5	10	8	26
09	Analytical problem solving	1	10	2	10	23
20	Exercising judgment	1	12	9	1	23
35	Communicating clearly	1	11	2	8	22
29	Getting others to perform	1	4	9	4	18
06	Programming subject matter	1	13	2	1	17
24	Explicating goals/procedures	1	7	7	2	17
30	Adapting to situation/demands	2	4	9	2	17
15	Presenting orally	3	8	5	0	16
08	Analytical reading/study	0	7	5	2	14
22	Estimating expenses/resources	4	6	3	1	14
26	Locating/maintaining info	2	8	3	1	14
37	Assessing skills/potentials	0	6	4	2	12
39	Constructing measurement tools	2	3	2	5	12
21	Tracking activities/goals	0	2	6	3	11
34	Coordinating activities	4	3	3	1	11
38	Using resources effectively	0	3	2	5	10
31	Taking another's perspective	0	4	2	3	9
16	Using media	1	4	3	0	8
03	Translating content to media	0	5	1	1	7
04	Using/applying feedback	0	3	3	1	7
13	Listening	0	3	4	0	7
32	Identifying/correcting errors	0	3	3	1	7
49	Interacting productively	0	3	3	0	6

APPENDIX 8

(Continued)

Set UV Coding	Enabling Skills	Project Focus				Totals (20)
		Res (5)	Dev (7)	Diff (5)	Eval (3)	
07	Programming technical equip	0	0	0	5	5
33	Graphically illustrating	0	2	2	0	4
42	Eliciting responses	0	0	3	0	3
45	Assessing personal performance	0	0	1	2	3
28	Running task oriented meetings	0	0	2	0	2
36	Cataloging/classifying	1	0	1	0	2
40	Defining terms/problems	0	0	0	2	2
43	Instilling confidence	0	0	1	1	2
44	Fiscal accounting	0	0	2	0	2
46	Placing others at ease	0	1	1	0	2
48	Establishing credibility	0	1	0	1	2
12	Disciplining others	0	1	0	0	1
41	Maintaining physical condition	0	0	1	0	1
47	Recalling	0	1	0	0	1
Totals		89	323	281	155	848

APPENDIX 9

Primary Categories of Sensitivities, and the Number of Sensitivity Statements Coded Within Them by Project Focus

Set UV Coding	Enabling Sensitivities	Project Focus				Totals
		Res (5)	Dev (7)	Diff (5)	Eval (3)	(20)
02	Capabilities and limitations	10	39	16	11	76
16	Existing value systems	5	29	20	10	64
03	Needs of self and others	2	21	23	4	50
30	Response sets of target audiences	3	8	20	7	38
22	Responses of target audiences	7	12	9	3	31
01	Values of self and others	6	11	11	1	29
04	Interactions of self and others	3	6	15	1	25
13	Language barriers	2	14	6	2	24
31	Nature/scope of output	3	8	3	5	19
18	Potential conflict of interest	4	9	4	1	18
21	Limitations of analyses/data	2	6	4	6	18
17	Personality of others	1	5	10	1	17
09	Awareness of alternatives	4	4	0	0	8
10	Awareness of structure	6	5	5	0	16
27	Acceptability of output	1	6	7	0	14
06	Worth in disciplines/methods	0	5	2	6	13
47	Willingness to work as needed	0	3	1	9	13
15	Degrees of freedom to deviate	2	3	5	1	11
37	Willingness to delegate	0	2	3	6	11
11	Awareness of method	3	6	1	0	10
24	Sources of error	1	3	4	2	10
20	Unstated obligations	2	4	2	1	9
25	Individual differences	0	2	6	1	9
34	Willingness to accept guidance	1	3	2	3	9
19	Supportiveness required	0	1	5	2	8
23	Cost/benefit factors	1	4	3	0	8
33	Need for excellence in work	0	1	3	4	8
36	Feeling of personal security	1	0	3	4	8
38	Emerging directions	2	2	1	3	8
05	Context of subject matter	0	2	4	1	7
14	Reality in goal setting	2	5	0	0	7
28	Admitting error/adapting	0	2	1	4	7
35	Need to communicate effectively	0	2	2	3	7
44	Interested in activities	2	0	0	5	7
26	Recognition of data needs	2	1	3	0	6

APPENDIX 9

(Continued)

Set UV Coding	Enabling Sensitivities	Project Focus				Totals (20)
		Res (5)	Dev (7)	Diff (5)	Eval (3)	
40	Contractual/stated obligations	0	3	0	3	6
55	Respect for/trust in others	0	0	1	5	6
29	Willingness to experiment	1	3	1	0	5
07	Context of objectives	2	2	0	0	4
42	Enthusiasm	0	1	0	3	4
50	Intellectual openness	0	2	0	2	4
52	Awareness of staff affect	0	3	1	0	4
08	Worth in objectives	0	2	1	0	3
12	Role of catalyst/synthesizer	0	2	1	0	3
32	Reality in spending	0	0	3	0	3
41	Inquisitiveness	0	1	1	1	3
45	Sound variability	0	0	2	0	2
48	Common sense	0	1	0	1	2
51	Possible points of confusion	0	2	0	0	2
53	Creative	0	2	0	0	2
58	Willingness to support staff	0	1	1	0	2
39	Limits of "one-shot" efforts	0	1	0	0	1
43	Challenged by activities	0	1	0	0	1
46	Sense of humor	0	0	1	0	1
49	Willingness to learn	0	1	0	0	1
54	Manageability of data	0	1	0	0	1
56	Habit of thoroughness	0	0	0	1	1
57	Deadlines	0	1	0	0	1
Totals		81	264	217	123	685

APPENDIX 10

The Functions Served by Outputs Within Project Foci
(the function of an output)

Output Dimension: Structure		Output Dimension: Function			Output Totals
Set DE Coding	Cluster Categories: Products	Policy	Mgmt	Prod	
01	Reports/Contracts	0	79	43	122
04	Work Specifications/Procedures	3	38	37	78
27	Data (including printouts)	0	38	37	75
02	Data Instrucments/Techniques	0	27	47	74
08	Plans/Designs/Theories/Models	7	48	18	73
05	Work Management Systems	0	57	5	62
03	Guides/Manuals	3	24	29	56
10	Publications	1	15	36	52
07	Resource Lists	0	17	27	44
14	Instructnl Units/Use w/Staff	0	4	35	39
12	Instructnl Units/In-School	0	0	29	29
13	Instructnl Units/Extra-School	0	0	18	18
11	Promotional Materials	0	4	13	17
28	Taxonomies	0	0	5	5
29	Recommendations	0	4	0	4
36	Curricular Objectives	0	0	3	3
37	Critiques	0	3	0	3
06	Data Management Systems	0	2	0	2
09	Equipment/Tools/Facilities	0	1	1	2
42	Prediction Variables	0	0	1	1
Totals		14	361	384	759

Output Dimension: Structure		Output Dimension: Function			Output Totals
Set DE Coding	Cluster Categories: Events	Policy	Mgmt	Prod	
32	Recruiting/Placing Staff	0	21	0	21
33	Collecting/Analyzing Data	0	9	7	16
52	Adapting Materials	0	0	12	12
43	Establishing Opns Parameters	7	4	0	11
17	Workshops/Institutes	0	4	6	10
40	Acquiring Supplies/Facilities	0	8	2	10
31	Field Trials/Experiments	0	6	1	7
38	Training	0	7	0	7
51	Acquiring Funds	0	6	0	6

APPENDIX 10

(Continued)

Output Dimension: Structure		Output Dimension: Function			Output Totals
Set DE Coding	Cluster Categories: Events	Policy	Mgmt	Prod	
48	Maintaining Accountability	0	5	0	5
18	Presentations	0	2	2	4
19	Benchmark Decisions	1	2	1	4
50	Disseminating Info/Outputs	0	4	0	4
30	Committee/Consultant Meetings	0	3	0	3
15	Staff Meeting	0	2	0	2
16	Conferences/Seminars	1	1	0	2
39	Updating of Machine Systems	0	1	1	2
47	Coordinating Efforts	0	2	0	2
49	Establishing Field Sites	0	2	0	2
Totals		9	89	32	130

Output Dimension: Structure		Output Dimension: Function			Output Totals
Set DE Coding	Cluster Categories: Conditions	Policy	Mgmt	Prod	
21	Working Environment/Atmosphere	0	19	0	19
20	Cooperative Relationships	1	12	1	14
34	Coordinated Efforts	1	8	1	10
22	Quality Assurance	1	6	0	7
23	Accountability	0	6	0	6
25	Resource Accessibility	0	4	0	4
41	Effective Communication	0	3	1	4
44	Provision for Services	0	1	3	4
45	Informed Public	0	2	0	2
26	Available Field Sites	0	1	0	1
35	Acceptance/Adoption of Outputs	0	1	0	1
46	Trained Staff	0	1	0	1
Totals		3	64	6	73
Grand Totals		26	514	422	962

APPENDIX 11

The Uses Made of Outputs Within Project Foci
(the character of an output)

Output Dimension: Structure		Output Dimension: Character				Output Totals
Set DE Coding	Cluster Categories: Products	Know	Tech	Imp	Info	
01	Reports/Contracts	10	18	16	78	122
04	Work Specifications/Procedures	0	74	0	4	78
27	Data (including printouts)	2	3	1	69	75
02	Data Instruments/Techniques	0	74	0	0	74
08	Plans/Designs/Theories/Models	3	69	1	0	73
05	Work Management Systems	2	47	9	4	62
03	Guides/Manuals	0	55	0	1	56
10	Publications	0	6	36	10	52
07	Resource Lists	0	33	1	10	44
14	Instructnl Units/Use w/Staff	0	39	0	0	39
12	Instructnl Units/In-School	0	28	1	0	29
13	Instructnl Units/Extra-School	0	15	3	0	18
11	Promotional Materials	0	1	16	0	17
28	Taxonomies	0	5	0	0	5
29	Recommendations	0	0	0	4	4
36	Curricular Objectives	0	3	0	0	3
37	Critiques	0	0	0	3	3
06	Data Management Systems	0	2	0	0	2
09	Equipment/Tools/Facilities	0	1	1	0	2
42	Prediction Variables	0	0	0	1	1
Totals		17	473	85	184	759

Output Dimension: Structure		Output Dimension: Character				Output Totals
Set DE Coding	Cluster Categories: Events	Know	Tech	Imp	Info	
32	Recruiting/Placing Staff	2	8	8	3	21
33	Collecting/Analyzing Data	1	8	0	7	16
52	Adapting Materials	0	12	0	0	12
43	Establishing Opns Parameters	0	4	2	5	11
17	Workshops/Institutes	0	8	2	0	10
40	Acquiring Supples/Facilities	1	6	2	1	10
31	Field Trials/Experiments	0	7	0	0	7
38	Training	0	4	2	1	7
51	Acquiring Funds	0	0	6	0	6

APPENDIX 11

(Continued)

Output Dimension: Structure		Output Dimension: Character				Output Totals
Set DE Coding	Cluster Categories: Events	Know	Tech	Imp	Info	
48	Maintaining Accountability	2	3	0	0	5
18	Presentations	0	0	4	0	4
19	Benchmark Decisions	1	3	0	0	4
50	Disseminating Info/Output	0	0	4	0	4
30	Committee/Consultant Meetings	0	0	1	2	3
15	Staff Meeting	1	0	0	1	2
16	Conferences/Seminars	0	2	0	0	2
39	Updating of Machine Systems	0	2	0	0	2
47	Coordinating Efforts	0	2	0	0	2
49	Establishing Field Sites	1	1	0	0	2
Totals		9	70	31	20	130

Output Dimension: Structure		Output Dimension: Character				Output Totals
Set DE Coding	Cluster Categories: Conditions	Know	Tech	Imp	Info	
21	Working Environment/Atmosphere	5	5	6	3	19
20	Cooperative Relationships	2	6	5	1	14
34	Coordinated Efforts	1	6	2	1	10
22	Quality Assurance	1	5	1	0	7
23	Accountability	2	2	1	1	6
25	Resource Accesibility	1	3	0	0	4
41	Effective Communication	1	1	2	0	4
44	Provision for Services	0	4	0	0	4
45	Informed Public	0	0	2	0	2
26	Available Field Sites	1	0	0	0	1
35	Acceptance/Adoption of Outputs	0	0	1	0	1
46	Trained Staff	0	1	0	0	1
Totals		14	33	20	6	73
Grand Totals		40	576	136	210	962

APPENDIX 12

The Positions Held by Outputs Within Project Foci
(tne level of an output)

Output Dimension: Structure		Output Dimension: Level			Output Totals
Set DE Coding	Cluster Categories: Products	Focal	Compon	Facil	
01	Reports/Contracts	41	18	63	122
04	Work Specifications/Procedures	1	19	58	78
27	Data (including printouts)	6	17	52	75
02	Data Instruments/Techniques	1	26	47	74
07	Resource Lists	7	9	57	73
08	Plans/Designs/Theories/Models	7	9	57	73
05	Work Management Systems	5	5	52	62
03	Guides/Manuals	9	17	30	56
10	Publications	21	13	18	52
14	Instructnl Units/Use w/Staff	1	28	10	39
12	Instructnl Units/In-School	6	21	2	29
13	Instructnl Units/Extra-School	4	10	4	18
11	Promotional Materials	1	10	6	17
28	Taxonomies	2	3	0	5
29	Recommendations	0	0	4	4
36	Curricular Objectives	0	2	1	3
37	Critiques	0	0	0	3
06	Data Management Systems	0	0	2	2
09	Equipment/Tools/Facilities	1	0	1	2
42	Prediction Variables	0	1	0	1
Totals		119	212	428	759

Output Dimension: Structure		Output Dimension: Level			Output Totals
Set DE Coding	Cluster Categories: Events	Focal	Compon	Facil	
32	Recruiting/Placing Staff	0	0	21	21
33	Collecting/Analyzing Data	0	0	16	16
52	Adapting Materials	0	0	12	12
43	Establishing Opns Parameters	3	0	8	11
17	Workshops/Institutes	0	4	6	10
40	Acquiring Supplies/Facilities	0	0	10	10
31	Field Trials/Experiments	0	0	7	7
38	Training	1	0	6	7
51	Acquiring Funds	0	0	6	6

APPENDIX 12

(Continued)

Output Dimension: Structure		Output Dimension: Level			Output Totals
Set DE Coding	Cluster Categories: **Events**	Focal	Compon	Facil	
48	Maintaining Accountability	0	0	5	5
18	Presentations	1	1	2	4
19	Benchmark Decisions	0	0	4	4
50	Disseminating Info/Outputs	2	0	2	4
30	Committee/Consultant Meetings	0	0	3	3
15	Staff Meeting	0	0	2	2
16	Conferences/Seminars	0	0	2	2
39	Updating of Machine Systems	0	0	2	2
47	Coordinating Efforts	0	0	2	2
49	Establishing Field Sites	0	0	2	2
Totals		7	5	118	130

Output Dimension: Structure		Output Dimension: Level			Output Totals
Set DE Coding	Cluster Categories: **Conditions**	Focal	Compon	Facil	
21	Working Environment/Atmosphere	0	0	19	19
20	Cooperative Relationships	2	0	12	14
34	Coordinated Efforts	1	0	9	10
22	Quality Assurance	0	0	7	7
23	Accountability	0	0	6	6
25	Resource Accessibility	1	0	3	4
41	Effective Communication	0	0	4	4
44	Provision for Services	3	0	1	4
45	Informed Public	1	0	1	2
26	Available Field Sites	0	0	1	1
35	Acceptance/Adoption of Outputs	0	0	1	1
46	Trained Staff	0	0	1	1
Totals		8	0	65	73
Grand Totals		134	217	611	962

APPENDIX 13

A Summary of the Standards Held for the Outputs Classified Within Frequently Used Output Cluster Categories

Coding Sets				
DE	J	LM	Cluster Output Category Structure of Standards Primary Category of Standard	Freq.
01			Reports/Contracts	26
	1		Output Standards	83
		01	Completeness of content	9
		02	Quantity of outputs/data	1
		04	Communication and clarity	7
		05	Utility or value	3
		06	Acceptance by users	1
		07	Personal satisfaction/feeling	3
		08	Agreement/concurrence w/others	5
		09	Lack of errors/discrepancies	5
		11	Appropriate design/content	3
		12	Goal attainment	10
		13	Acceptance by others (in project)	9
		14	Acceptance by sponsor	7
		15	Compliance w/sponsor guideline	3
		16	Compares favorably	4
		17	Internally consistent	2
		18	Satisfactory appearance	3
		19	Logical criteria	2
		21	Sources of variance controlled	2
		24	Terminology appropriate	3
		29	Meets design expectations	1
	2		Process Standards	16
		02	Personnel are satisfied	1
		04	Deadlines are met	4
		11	Costs consistent w/estimates	1
		17	External enthusiasm evident	1
		20	Performance respected	2
		24	Costs acceptable for benefits	1
		25	Staff reflect trust	1
		34	Impact of effort favorable	2
		35	Outputs distributed/requested	1
		39	Evidence of pre-planning	1
		40	Outputs published externally	1

APPENDIX 13

(Continued)

Coding Sets	Output and Work Requirement Categories	Freq.
DE J LM	Cluster Output Category Structure of Standards **Primary Category** of Standard	
02	Data Instruments/Techniques	20
1	Output Standards	64
01	Completeness of content	5
03	Quantity of effort expended	1
04	Communication and clarity	3
05	Utility or value	5
07	Personal satisfaction/feeling	4
08	Agreement/concurrence w/others	1
09	Lack of errors/discrepancies	1
11	Appropriate design/content	4
12	Goal attainment	4
13	Acceptance by others (in project)	10
14	Acceptance by sponsor	1
16	Compares favorably	1
17	Internally consistent	1
18	Satisfactory appearance	1
19	Logical criteria	2
20	Performs consistently	1
21	Sources of variance controlled	2
22	Functions as planned	10
26	Components are complementary	1
28	Operable by others	2
30	Lack of negative feedback	2
31	Meets legal constraints	1
32	Created by ruputable producer	1
2	Process Standards	4
12	No obvious omissions	1
17	External enthusiasm evident	2
24	Costs acceptable for benefits	1
04	Work Specifications/Procedures	21
1	Output Standards	70
01	Completeness of content	3

APPENDIX 13

(Continued)

Coding Sets			Output and Work Requirement Categories	Freq.
DE	J	LM	Cluster Output Category Structure of Standards Primary Category of Standard	
		02	Quantity of outputs/data	1
		03	Quantity of effort expended	1
		04	Communication and clarity	9
		05	Utility or value	4
		06	Acceptance by users	1
		07	Personal satisfaction/feeling	5
		08	Agreement/concurrence w/others	2
		09	Lack of errors/discrepancies	5
		11	Appropriate design/content	7
		12	Goal attainment	5
		13	Acceptance by others (in project)	6
		14	Acceptance by sponsor	3
		15	Compliance w/sponsor guideline	1
		17	Internally consistent	5
		18	Satisfactory appearance	3
		19	Logical criteria	4
		22	Functions as planned	3
		25	Awareness that outputs exist	2
	2		Process Standards	12
		03	Minimum correction required	1
		04	Deadlines are met	2
		07	An expected activity occurs	1
		14	No felt deficiencies	1
		17	External enthusiasm evident	4
		24	Costs acceptable for benefits	1
		28	Closure reached on questions	1
		34	Impact of effort favorable	1
08			Plans/Designs/Theories/Models	26
	1		Output Standards	82
		01	Completeness of content	11
		04	Communication and clarity	1
		05	Utility or value	7
		06	Acceptance by users	3
		07	Personal satisfaction/feeling	3

APPENDIX 13

(Continued)

Coding Sets DE	J	LM	Output and Work Requirement Categories: Cluster Output Category	Structure of Standards	Primary Category of Standard	Freq.
		08			Agreement/concurrence w/others	2
		09			Lack of errors/discrepancies	3
		11			Appropriate design/content	5
		12			Goal attainment	4
		13			Acceptance by others (in project)	10
		14			Acceptance by sponsor	1
		15			Compliance w/sponsor guideline	4
		16			Compares favorably	7
		17			Internally consistent	2
		19			Logical criteria	2
		20			Performs consistently	2
		21			Sources of variance controlled	4
		22			Functions as planned	2
		23			Successfully constrains/guides	3
		24			Terminology appropriate	2
		26			Components are complementary	2
		30			Lack of negative feedback	2
	2			Process Standards		20
		04			Deadlines are met	1
		08			Staff contributions accepted	1
		09			Outside contributions accepted	2
		15			Tasks perceived and acted upon	1
		16			External cooperation gained	1
		21			Follow-on proposals are funded	1
		23			Project view accepted	1
		24			Costs acceptable for benefits	2
		28			Closure reached on questions	2
		34			Impact of effort favorable	1
		36			Employment criteria met	6
		41			Guidelines are followed	1
20			Cooperative Relationships			12
	1			Output Standards		8
		02			Quantity of outputs/data	1

APPENDIX 13

(Continued)

Coding Sets	Output and Work Requirement Categories	Freq.
DE	Cluster Output Category	
J	Structure of Standards	
LM	Primary Category of Standard	
06	Acceptance by users	1
07	Personal satisfaction/feeling	2
13	Acceptance by others (in project)	1
22	Functions as planned	2
25	Awareness that outputs exist	1
2	Process Standards	33
02	Personnel are satisfied	1
04	Deadlines are met	2
05	Acceptable level of output	1
07	An expected activity occurs	1
08	Staff contributions accepted	1
13	Work conducted w/in budget	1
15	Tasks perceived and acted upon	1
16	External cooperation gained	3
17	External enthusiasm evident	4
20	Performance respected	1
21	Follow-on proposals are funded	1
22	Feedback occurs	1
23	Project view accepted	1
24	Costs acceptable for benefits	1
25	Staff reflect trust	2
26	Values and objectives match	2
27	Decisions result in action	1
29	Creativity in work evidenced	1
34	Impact of effort favorable	6
35	Outputs distributed/requested	1
21	Working Environment/Atmosphere	15
1	Output Standards	2
04	Communication and clarity	1
23	Successfully constrains/guides	1
2	Process Standards	52
01	Personnel cooperate	2
02	Personnel are satisfied	5
04	Deadlines are met	1
05	Acceptable level of output	4
07	An expected activity occurs	1

APPENDIX 13

(Continued)

Coding Sets			Output and Work Requirement Categories	
DE	J	LM	Cluster Output Category Structure of Standards **Primary Category of Standard**	Freq.
		10	Maximum possible participation	1
		12	No obvious omissions	1
		13	Work conducted w/in budget	2
		15	Tasks perceived and acted upon	11
		18	Desired personnel obtained	3
		20	Performance respected	3
		25	Staff reflect trust	4
		26	Values and objectives match	3
		29	Creativity in work evidenced	1
		30	Personnel loss not excessive	2
		33	Personal growth/productivity	1
		34	Impact of effort favorable	3
		43	Policy constraints minimal	1
		44	Responsibility taken willingly	1
		45	Resources used efficiently	1
		46	Staff are self-directing	1
27			Data (including printouts)	13
	1		Output Standards	46
		01	Completeness of content	4
		04	Communication and clarity	3
		05	Utility or value	7
		06	Acceptance by users	3
		07	Personal satisfaction/feeling	4
		08	Agreement/concurrence w/others	1
		09	Lack of errors/discrepancies	2
		11	Appropriate design/content	1
		12	Goal attainment	5
		13	Acceptance by others (in project)	4
		16	Compares favorably	3
		17	Internally consistent	1
		18	Satisfactory appearance	1
		19	Logical criteria	1
		21	Sources of variance controlled	3
		22	Functions as planned	2
		28	Operable by others	1

APPENDIX 13

(Continued)

Coding Sets			Output and Work Requirement Categories			Freq.
DE	J	LM	Cluster Output Category	Structure of Standards	Primary Category of Standard	
	2			Process Standards		14
		04			Deadlines are met	1
		05			Acceptable level of output	1
		07			An expected activity occurs	2
		11			Costs consistent w/estimates	2
		12			No obvious omissions	1
		14			No felt deficiencies	3
		24			Costs acceptable for benefits	2
		32			Resources available on request	1
		36			Employment criteria met	1
32			Recruiting/Placing Staff			14
	1			Output Standards		14
		06			Acceptance by users	8
		07			Personal satisfaction/feeling	2
		08			Agreement/concurrence w/others	2
		09			Lack of errors/discrepancies	1
		12			Goal attainment	1
	2			Process Standards		47
		01			Personnel cooperate	5
		03			Minimum correction required	1
		04			Deadlines are met	2
		05			Acceptable level of output	3
		06			Work structure is efficient	1
		07			An expected activity occurs	1
		12			No obvious omissions	1
		13			Work conducted w/in budget	6
		14			No felt deficiencies	3
		15			Tasks perceived and acted upon	1
		17			External enthusiasm evident	1
		18			Desired personnel obtained	2
		19			Adequate reputation w/sponsor	1
		20			Performance respected	4
		26			Values and objectives match	2
		36			Employment criteria met	12
		37			Staff adaptive to situations	1

APPENDIX 13

(Continued)

Coding Sets DE J LM	Output and Work Requirement Categories Cluster Output Category Structure of Standards Primary Category of Standard	Freq.
33	Collecting/Analyzing Data	4
1	Output Standards	14
01	Completeness of content	1
02	Quantity of outputs/data	1
05	Utility or value	2
07	Personal satisfaction/feeling	2
11	Appropriate design/content	1
12	Goal attainment	2
13	Acceptance by others (in project)	1
16	Compares favorably	1
21	Sources of variance controlled	1
24	Terminology appropriate	1
30	Lack of negative feedback	1
2	Process Standards	4
03	Minimum correction required	1
07	An expected activity occurs	1
27	Decisions result in action	1
34	Impact of effort favorable	1

APPENDIX 14

A Summary of the Tasks Pursued in Producing the Outputs Classified Within Frequently Used Output Cluster Categories

Coding Sets DE	NO	QR	Output and Work Requirement Categories: Cluster Output Category	Task Cluster Category	Primary Category of Task	Freq.
01			Available Field Sites			26
	01			Clarifying Problem Addressed		22
		02			Specify context/scope/limits of effort	1
		03			Specify variables to be studied	2
		06			Observe relevant/related field opns	1
		07			Identify characteristics tgt population	2
		12			Review of/Familiarization w/Materials	16
	02			Formulating objectives		10
		02			Conceptualize the product and context	1
		03			Formulate specific questions/hypotheses	2
		04			Determine nature of msmt objectives	1
					Confer with colleagues/others re objects	6
	03			Designing the output		24
		03			Determine relation of variables/compnts	2
		05			Specify/select grouping/sampling	1
		06			Specify treatments/procedures/strategies	3
		07			Conceptualize output application	1
		08			Translate objectives/data into meaning	1
		09			Visualize/specify format/appearance	6
		10			Specify/identify character of materials	7
		17			Specify measures to be used	1
		19			Specify kind of data analysis to be used	1
		20			State overall design	1
	04			Producing the output		73
		01			Construct/assemble measurement tools	7
		02			Construct/assemble components of output	24
		04			Secure/select required materials/comps	3
		05			Produce output	23
		08			Select/produce data processing/handling	2
		09			Translate outcomes/content to user terms	2
		12			Invent new production method/instrument	3
		13			Construct/employ production tools/aids	8

APPENDIX 14

(Continued)

Coding Sets			Output and Work Requirement Categories	
DE	NO	QR	Cluster Output Category Task Cluster Category Primary Category of Task	Freq.
		18	Provide materials to producers	1
	05		Collecting/processing data	50
		02	Administer/Implement data instruments	21
		03	Record/score/classify/code raw data	10
		06	Perform analyses as specified/indicated	3
		07	Compile computational data	1
		09	Interpret data	12
		10	Acquire artifacts	1
		11	Try out output/component for operability	1
		19	Specify/identify data identity codes	1
	06		Assessing the output quality	37
		01	Check output against specifications	5
		03	Determine achievement of objectives	1
		08	Determine inadequate output components	3
		10	Confirm operability/validity of tools	4
		11	Judge effectiveness of data gathering	1
		14	Note/make advisable modification(s)	7
		15	Proofread/edit written material	16
	07		Diffusing the output	3
		17	Distribute output/component	3
	21		Procuring professional staff	9
		01	Analyze work for competencies required	2
		03	Formulate job descriptions/qualif/salary	2
		10	Select/Hire/Appoint personnel	3
		13	Determine manpower needs	1
		14	Determine tasks to procure staff	1
	22		Effecting accountability	40
		01	Specify accountability procedures	2
		04	Establish/Maintain time lines	6
		05	Project cost estimates	2
		06	Determine nature/content of reporting	1
		09	Monitor expenditure of time/svcs/money	2

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(Continued)

Coding Sets			Output and Work Requirement Categories			Freq.
DE	NO	QR	Cluster Output Category	Task Cluster Category	Primary Category of Task	
		10			Report status as required/appropriate	7
		11			Explicate obj/outputs to be produced	1
		12			Explicate procedures/strategies/duties	2
		14			Issue production orders	4
		16			Compare expenditure rate with plan	1
		19			Maintain materials/use/fiscal records	4
		21			Develop record keeping system	1
		22			Estimate/Provide material/personnel	1
		23			Direct/Request special reports	1
		27			Monitor/Determine cost-effectiveness	1
		28			Specify/Establish/Adopt policies	2
		30			Obtain staff input regarding time/funds	1
		31			Participate in production efforts as req	1
	23			Procuring systems/services		9
		01			Determine tasks/services to be performed	1
		02			Determine facilities/field material req	1
		05			Negotiate contract/coop w/sites/services	5
		07			Arrange visitation/schedule as needed	2
	24			Effecting quality control		33
		06			Monitor adherence to output specs	3
		09			Initiate/Direct quality control action	6
		10			Monitor progress/status of work	3
		11			Proof/critique products/performances	6
		14			Determine need for/present alternatives	1
		16			Negotiate quality issues with sponsor	4
		17			Direct/request critiques from others	6
		23			Confirm accuracy of data inputs/outputs	4
	25			Maintaining job satisfaction		2
		01			Specify/explain agency/project position	1
		03			Recognize merit	1
	26			Facilitating growth of staff		2
		06			Specify ownership/authorship policies	1
		07			Encourage publication of important work	1

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(Continued)

Coding Sets			Output and Work Requirement Categories			Freq.
DE	NO	QR	Cluster Output Category	Task Cluster Category	Primary Category of Task	
	29			Facilitating relationships		17
		04			Interact w/setting to elicit cooperation	5
		14			Interact with setting to collaborate	2
		15			Interact w/setting to enhance	8
		16			Make materials/experiences available	1
		17			Provide foreign language translations	1
	30			Effecting information flow patterns		4
		03			Insure that key decision points get info	4
	31			Diffusing information within project		13
		03			Produce/circulate bulletins/memos/news	1
		08			Communicate production guidelines	7
		09			Keep involved personnel informed generally	1
		12			Refer problem to appropriate specialists	2
		13			Record events (e.g., minutes, processes)	1
		15			Advise technically within expertise	1
	32			Diffusing information beyond project		3
		04			Report project at agency/other meetings	2
		11			Approve articles/papers for publication	1
02			Data Instruments/Techniques			20
	01			Clarifying Problem Addressed		26
		01			Review Problem-relevant literature/info	6
		02			Specify context/scope/limits of effort	1
		03			Specify variables to be studied	3
		08			Determine problems to be addressed	1
		11			Visualize application of technique/ideas	3
		12			Review of/Familiarization w/materials	11
		14			Compare existing frameworks/procedures	1
	02			Formulating objectives		18
		01			Conceptualize the theoretical framework	2
		02			Conceptualize the product and context	2

APPENDIX 14

(Continued)

Coding Sets			Output and Work Requirement Categories			
DE	NO	QR	Cluster Output Category	Task Cluster Category	Primary Category of Task	Freq.
		03			Formulate specific questions/hypotheses	3
		06			Create objectives	1
		07			Confer with colleagues/others re objects	10
	03			Designing the output		21
		01			Identify decision situations of interest	1
		03			Determine relation of variables/compnts	3
		06			Specify treatments/procedures/strategies	3
		07			Conceptualize output application	2
		09			Visualize/specify format/appearance	4
		10			Specify/identify character of materials	6
		12			Estab tolerances/effectiveness criteria	1
		18			Specify data/info processing/up-date	1
	04			Producing the output		60
		02			Construct/assemble components of output	38
		05			Produce output	6
		07			Package output	3
		13			Construct/employ production tools/aids	1
		14			Adapt materials for local/specific use	9
		18			Provide materials to producers	1
		19			Adapt content into processing format	2
	05			Collecting/processing data		34
		01			Conduct/operate program to be measured	2
		02			Administer/Implement data instruments	3
		03			Record/score/classify/code raw data	6
		04			Transfer raw data into storage form	1
		05			Translate data into processing form	3
		06			Perform analyses as specified/indicated	2
		08			Prepare supporting documentation	2
		09			Interpret data	7
		11			Try out output/component for operability	8
	06			Assessing the output quality		30
		01			Check output against specifications	3
		02			Judge significance of performance result	3
		06			Judge output operability/acceptability	3

APPENDIX 14

(Continued)

Coding Sets			Output and Work Requirement Categories			Freq.
DE	NO	QR	Cluster Output Category	Task Cluster Category	Primary Category of Task	
		07			Judge output effectiveness/consistency	1
		08			Determine inadequate output components	2
		10			Confirm operability/validity of tools	1
		14			Note/make advisable modification(s)	15
		15			Proofread/edit written material	1
		20			Select best alternative method/procedure	1
	22			Effecting accountability		8
		02			Delegate responsibilities/authority	3
		14			Issue production orders	2
		18			Insure optimal use of resources	1
		19			Maintain materials/use/fiscal records	1
		26			Divide work into appropriate segments	1
	23			Procuring systems/services		7
		05			Negotiate contract/coop w/sites/services	1
		06			Get permission to use copyright material	1
		07			Arrange visitation/schedule as needed	4
		08			Make public service/material/site needs	1
	24			Effecting quality control		12
		07			Monitor personnel performance	1
		11			Proof/critique products/performances	6
		17			Direct/request critiques from others	3
		23			Confirm accuracy of data inputs/outputs	2
	29			Facilitating relationships		5
		04			Interact w/setting to elicit cooperation	1
		05			Communicate behavior required of setting	1
		14			Interact with setting to collaborate	3
	30			Effecting information flow patterns		4
		02			Determine/use information sources	3
		03			Insure that key decision points get info	1
	31			Diffusing information within project		17
		03			Produce/circulate bulletins/memos/news	2
		04			Lead/participate in task-oriented groups	5

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(Continued)

Coding Sets			Output and Work Requirement Categories			Freq.
DE	NO	QR	Cluster Output Category	Task Cluster Category	Primary Category of Task	
		05			Join in/lead infor meetings/contacts	2
		06			Receive and react to relevant input	3
		08			Communicate production guidelines	1
		09			Keep involved personnel informed generally	1
		15			Advise technically within expertise	3
	33			Effecting decision mechanisms		6
		03			Make decisions	6
04			Work Specifications/Procedures			21
	01			Clarifying Problem Addressed		31
		01			Review Problem-relevant literature/info	6
		02			Specify context/scope/limits of effort	4
		03			Specify variables to be studied	1
		06			Observe relevant/related field opns	2
		08			Determine problems to be addressed	1
		09			Determine sensitive areas in tgt context	1
		10			Determine priorities of problems	1
		12			Review of/Familiarization w/materials	9
		13			Obtain literature relevant to problem	1
		15			Operationally define terms/variables	5
	02			Formulating objectives		14
		01			Conceptualize the theoretical framework	1
		02			Conceptualize the product and context	2
		04			Determine nature of msmt objectives	1
		06			Create objecjectives	4
		07			Confer with colleagues/others re objects	6
	03			Designing the output		42
		02			Isolate contaminating variables	1
		03			Determine relation of variables/compnts	6
		04			Select/specify population(s) involved	4
		05			Specify/select grouping/sampling	2
		06			Specify treatments/procedures/strategies	5

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(Continued)

Coding Sets			Output and Work Requirement Categories	
DE	NO	QR	Cluster Output Category Task Cluster Category **Primary Category of Task**	Freq.
		07	Conceptualize output application	1
		08	Translate objectives/data into meaning	1
		09	Visualize/specify format/appearance	3
		10	Specify/identify character of materials	7
		12	Estab tolerances/effectiveness criteria	4
		18	Specify data/info processing/up-date	1
		20	State overall design	3
		23	Consider/design alternative approaches	3
		24	Visualize/Specify effect of output	1
	04		Producing the output	23
		02	Construct/assemble components of output	7
		05	Produce output	7
		07	Package output	1
		08	Select/produce data processing/handling	3
		13	Construct/employ production tools/aids	4
		14	Adapt materials for local/specific use	1
	05		Collecting/processing data	36
		01	Conduct/operate program to be measured	2
		02	Administer/Implement data instruments	5
		03	Record/score/classify/code raw data	4
		04	Transfer raw data into storage form	1
		05	Translate data into processing form	4
		06	Perform analyses as specified/indicated	11
		07	Compile computational data	2
		08	Prepare supporting documentation	3
		09	Interpret data	1
		11	Try out output/component for operability	3
	06		Assessing the output quality	38
		01	Check output against specifications	3
		06	Judge output operability/acceptability	1
		07	Judge output effectiveness/consistency	1
		08	Determine inadequate output components	5
		11	Judge effectiveness of data gathering	1

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(Continued)

Coding Sets			Output and Work Requirement Categories			Freq.
DE	NO	OR	Cluster Output Category	Task Cluster Category	Primary Category of Task	
		14			Note/make advisable modification(s)	18
		15			Proofread/edit written material	6
		16			Determine adeq of implementation process	1
		17			Check recommended changes specs	1
		18			Judge output against personal standards	1
	07			Diffusing the output		2
		14			Negotiate user acceptance/use	2
	22			Effecting accountability		12
		02			Delegate responsibilities/authority	5
		04			Establish/Maintain time lines	4
		05			Project cost estimates	1
		13			Interact with advisory services	1
		14			Issue production orders	1
	23			Procuring systems/services		3
		05			Negotiate contract/coop w/sites/services	2
		07			Arrange visitation/schedule as needed	1
	24			Effecting quality control		20
		01			Specify/recommend criteria for output	2
		06			Monitor adherence to output specs	1
		07			Monitor personnel performance	2
		10			Monitor progress/status of work	4
		11			Proof/critique products/performances	1
		14			Determine need for/present alternatives	1
		16			Negotiate quality issues with sponsor	1
		17			Direct/request critiques from others	7
		18			Monitor staff awareness of responsibility	1
	25			Maintaining job satisfaction		2
		01			Specify/explain agency/project position	2
	26			Facilitating growth of staff		3
		01			Provide for guidance within project	3

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(Continued)

Coding Sets			Output and Work Requirement Categories			Freq.
DE	NO	QR	Cluster Output Category	Task Cluster Category	Primary Category of Task	
	29			Facilitating relationships		12
		04			Interact w/setting to elicit cooperation	4
		06			Explain/Prepare rationale for procedure to site	1
		10			Promote or maintain focus of effort	1
		14			Interact with setting to collaborate	1
		15			Interact w/setting to enhance	3
		16			Make materials/experiences available	2
	30			Effecting information flow patterns		1
		03			Insure that key decision points get info	1
	31			Diffusing information within project		8
		06			Recieve and react to relevant input	4
		08			Communicate production guidelines	1
		09			Keep involved personnel informed generally	1
		12			Refer problem to appropriate specialists	2
	33			Effecting decision mechanisms		1
		03			Make decisions	1
08			Plans/Designs/Theories/Models			26
	01			Clarifying problem addressed		39
		01			Review Problem-relevant literature/info	8
		02			Specify context/scope/limits of effort	3
		03			Specify variables to be studied	2
		04			Identify contaminating variables	2
		06			Observe relevant/related field opns	1
		08			Determine problems to be addressed	3
		09			Determine sensitive areas in tgt context	1
		10			Determine priorities of problems	1
		11			Visualize application of technique/ideas	3
		12			Review of/Familiarization w/materials	13
		15			Operationally define terms/variables	1
		16			Identify/Assess divergent points of view	1

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Coding Sets			Output and Work Requirement Categories			
DE	NO	QR	Cluster Output Category	Task Cluster Category	Primary Category of Task	Freq.
	02			Formulating objectives		30
		02			Conceptualize the product and context	4
		03			Formulate specific questions/hypotheses	2
		05			State problem in context of theory	3
		06			Create objectives	2
		07			Confer with colleagues/others re objects	19
	03			Designing the output		70
		01			Identify decision situations of interest	3
		02			Isolate contaminating variables	2
		03			Determine relation of variables/compnts	5
		04			Select/specify population(s) involved	3
		05			Specify/select grouping/sampling	11
		06			Specify treatments/procedures/strategies	13
		07			Conceptualize output application	4
		09			Visualize/specify format/appearance	1
		10			Specify/identify character of materials	11
		12			Estab tolerances/effectiveness criteria	4
		13			Establish specs for output try-out/demo	1
		15			Specify site adaptations required	1
		17			Specify measures to be used	3
		18			Specify data/info processing/up-date	2
		19			Specify kind of data analysis to be used	2
		20			State overall design	3
		22			Specify data collection schedule	1
	04			Producing the output		42
		01			Construct/assemble measurement tools	7
		02			Construct/assemble components of output	21
		04			Secure/select required mateirals/comps	2
		05			Produce output	6
		13			Construct/employ production tools/aids	2
		14			Adapt materials for local/specific use	2
		17			Organize presentation components	2

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(Continued)

Coding Sets			Output and Work Requirement Categories			
DE	NO	QR	Cluster Output Category	Task Cluster Category	Primary Category of Task	Freq.
	05			Collecting/processing data		20
		01			Conduct/operate program to be measured	1
		02			Administer/Implement data instruments	7
		03			Record/score/classify/code raw data	5
		06			Perform analyses as specified/indicated	2
		09			Interpret data	2
		11			Try out output/component for operability	2
		14			Specify parameters of sub-routines	1
	06			Assessing the output quality		39
		01			Check output against specifications	1
		08			Determine inadequate output components	4
		10			Confirm operability/validity of tools	1
		11			Judge effectiveness of data gathering	1
		12			Relate data to decision situations	1
		14			Note/make advisable modification(s)	25
		15			Proofread/edit written material	5
		16			Determine adeq of implementation process	1
	07			Diffusing the output		4
		14			Negotiate user acceptance/use	3
		17			Distribute output/component	1
	21			Procuring professional staff		2
		01			Analyze work for competencies required	1
		08			Identify potential candidates	1
	22			Effecting accountability		18
		02			Delegate responsibilities/authority	1
		04			Establish/Maintain time lines	3
		05			Project cost estimates	1
		09			Monitor expenditure of time/svcs/money	1
		11			Explicate obj/outputs to be produced	1
		12			Explicate procedures/strategies/duties	1
		13			Interact with advisory services	2
		14			Issue production orders	8

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(Continued)

Coding Sets			Output and Work Requirement Categories			Freq.
DE	NO	QR	Cluster Output Category	Task Cluster Category	Primary Category of Task	
	23			Procuring systems/services		16
		02			Determine facilities/field material req	1
		03			Identify/study possible sites/services	6
		04			Select/obtain sites/facilities/services	7
		05			Negotiate contract/coop w/sites/services	2
	24			Effecting quality control		26
		06			Monitor adherence to output specs	3
		07			Monitor personnel performance	1
		09			Initiate/Direct quality control action	3
		11			Proof/critique products/performances	4
		14			Determine need for/present alternatives	1
		17			Direct/request critiques from others	11
		22			Select outputs for further review	2
		24			Monior/Judge project impact	1
	26			Facilitating growth of staff		1
		06			Specify ownership/authorship policies	1
	29			Facilitating relationships		18
		04			Interact w/setting to elicit cooperation	3
		05			Communicate behavior required of setting	5
		06			Explain/Prepare rationale for procedure to site	4
		07			Negotiate resolution of differences	1
		10			Promote or maintain focus of effort	1
		13			Maintain contacts with field	2
		16			Make materials/experiences available	2
	30			Effecting information flow patterns		2
		03			Insure that key decision points get info	1
		07			Explicate/employ ways of enhancing flow	1
	31			Diffusing information within project		23
		01			Plan/conduct staff meetings/conferences	2
		02			Make formal presentations	2

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(Continued)

Coding Sets			Output and Work Requirement Categories			
DE	NO	QR	Cluster Output Category	Task Cluster Category	Primary Category of Task	Freq.
		03			Produce/circulate bulletins/memos/news	2
		04			Lead/participate in task-oriented groups	4
		06			Receive and react to relevant input	4
		08			Communicate production guidelines	4
		09			Keep involved personnel informed generally	1
		10			Communicate relevant experience info	2
		12			Refer problem to appropriate specialists	1
		15			Advise technically within expertise	1
	32			Diffusing information beyond project		1
		08			Interact with others regarding promotion	1
	33			Effecting decision mechanisms		4
		03			Make decisions	3
		10			Establish organizational structure	1
20			Cooperative Relationships			12
	01			Clarifying problem addressed		9
		01			Review Problem-relevant literature/info	1
		02			Specify context/scope/limits of effort	1
		06			Observe relevant/related field opns	2
		07			Identify characteristics tgt population	2
		09			Determine sensitive areas in tgt context	1
		10			Determine priorities of problems	1
		12			Review of/Familiarization w/materials	1
	02			Formulating objectives		6
		01			Conceptualize the theoretical framework	1
		02			Conceptualize the product and context	2
		06			Create objectives	1
		07			Confer with colleagues/others re objects	2
	04			Producing the output		10
		02			Construct/assemble components of output	10

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(Continued)

Coding Sets			Output and Work Requirement Categories			
DE	NO	OR	Cluster Output Category	Task Cluster Category	Primary Category of Task	Freq.
	05			Collecting/processing data		2
		02			Administer/Implement data instruments	1
		04			Transfer raw data into storage form	1
	06			Assessing the output quality		4
		07			Judge output effectiveness/consistency	1
		14			Note/make advisable modification(s)	3
	07			Diffusing the output		1
		15			Provide for user training as required	1
	21			Procuring professional staff		5
		08			Identify potential candidates	2
		09			Interview/screen candidates	1
		11			Provide training as appropriate	2
	22			Effecting accountability		5
		02			Delegate responsibilities/authority	2
		12			Explicate procedures/strategies/duties	2
		13			Interact with advisory services	1
	23			Procuring systems/services		3
		04			Select/obtain sites/facilities/services	1
		05			Negotiate contract/coop w/sites/services	2
	24			Effecting quality control		10
		01			Specify/recommend criteria for output	1
		04			Specify/develop improvement procedures	1
		07			Monitor personnel performance	2
		09			Initiate/Direct quality control action	1
		10			Monitor progress/status of work	1
		11			Proof/critique products/performances	3
		19			Approve potential staff for employment	1
	25			Maintaining job satisfaction		8

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(Continued)

Coding Sets			Output and Work Requirement Categories			Freq.
DE	NO	QR	Cluster Output Category	Task Cluster Category	Primary Category of Task	
		01			Specify/explain agency/project position	1
		02			Provide means for handling staff views	2
		03			Recognize merit	1
		06			Recommend promotions/salary increases	1
		09			Encourage optimal self-direction	2
		10			Foster mutual respect	1
	26			Facilitating growth of staff		2
		02			Provide opportunities for growth	1
		05			Provide opportunities for exposure	1
	27			Enhancing physical environment		1
		06			Optimize accessibility to equip/services	1
	29			Facilitating relationships		39
		01			Monitor field setting views/concerns	2
		04			Interact w/setting to elicit cooperation	2
		05			Communicate behavior required of setting	1
		07			Negotiate resolution of differences	2
		08			Locate/document sources of disagreement	2
		09			Adapt to accommodate differences	2
		10			Promote or maintain focus of effort	2
		11			Translate language into understood terms	2
		13			Maintain contacts with field	2
		14			Interact with setting to collaborate	5
		15			Interact w/setting to enhance	11
		16			Make materials/experiences available	6
	30			Effecting information flow patterns		9
		01			Define project information flow policies	2
		02			Determine/use information sources	1
		03			Insure that key decision points get info	4
		04			Provide communications equip/capability	1
		07			Explicate/employ ways of enhancing flow	1
	31			Diffusing information within project		15

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(Continued)

Coding Sets			Output and Work Requirement Categories			
DE	NO	QR	Cluster Output Category	Task Cluster Category	Primary Category of Task	Freq.
		02			Make formal presentations	1
		03			Produce/circulate bulletins/memos/news	2
		04			Lead/participate in task-oriented groups	3
		05			Join in/lead info meetings/contacts	1
		06			Receive and react to relevant input	1
		09			Keep involved personnel informed generally	5
		11			Advise on admin concerns w/in expertise	1
		12			Refer problem to appropriate specialists	1
	32			Diffusing information beyond project		10
		02			Prepare/disseminate promotional info	1
		04			Report project at agency/other meetings	6
		06			Interact with dissemination services	2
		10			Insure appropriate visibility of project	1
	33			Effecting decision mechanisms		5
		03			Make decisions	1
		04			Specify who needs what kinds of info	1
		07			Participate in decision-making process	1
		08			Identify/specify sources of problems	1
		10			Establish organizational structure	1
21			Working Environment/Atmosphere			15
	21			Procuring professional staff		31
		01			Analyze work for competencies required	5
		02			Determine competencies available	3
		03			Formulate job descriptions/qualif/salary	3
		07			Make vacancies known	3
		09			Interview/screen candidates	6
		10			Select/Hire/Appoint personnel	8
		12			Negotiate w/candidate to employ/partic	2
		17			Determine/assess best staffing pattern	1
	22			Effecting accountability		15
		02			Delegate responsibilities/authority	8
		04			Establish/Maintain time lines	2

APPENDIX 14

(Continued)

Coding Sets DE	NO	QR	Output and Work Requirement Categories: Cluster Output Category	Task Cluster Category	Primary Category of Task	Freq.
		11			Explicate obj/outputs to be produced	2
		12			Explicate procedures/strategies/duties	2
		26			Divide work into appropriate segments	1
	24			Effecting quality control		13
		07			Monitor personnel performance	2
		09			Initiate/Direct quality control action	4
		10			Monitor progress/status of work	1
		11			Proof/critique products/performances	1
		13			Monitor decisions made	1
		14			Determine need for/present alternatives	1
		17			Direct/request critiques from others	1
		18			Monitor staff awareness of responsibility	1
		21			Adjust staff for operation compatibility	1
	25			Maintaining job satisfaction		29
		01			Specify/explain agency/project position	4
		02			Provide means for handling staff views	6
		03			Recognize merit	3
		04			Counsel with/be supportive of personnel	3
		05			Adjust tasks to fit interests/limits	2
		06			Recommend promotions/salary increases	1
		09			Encourage optimal self-direction	5
		11			Support staff in decisions they make	1
		12			Foster feelings of security in job	1
		13			Provide for social activities	2
		15			Nurture staff feelings of importance	1
	26			Facilitating growth of staff		9
		01			Provide for guidance within project	6
		02			Provide opportunities for growth	1
		05			Provide opportunities for exposure	1
		07			Encourage publication of important work	1
	27			Enhancing physical environment		5
		01			Provide optimal proximity of staff	2
		03			Provide for privacy	1
		04			Provide meeting/relaxation facility	2

APPENDIX 14

(Continued)

Coding Sets DE	Coding Sets NO	Coding Sets QR	Output and Work Requirement Categories: Cluster Output Category	Task Cluster Category	Primary Category of Task	Freq.
	28			Maintaining equity among staff		2
		01			Set demands in keeping with competencies	1
		03			Insure equity in application of rules	1
	29			Facilitating relationships		5
		09			Adapt to accommodate differences	1
		14			Interact with setting to collaborate	2
		15			Interact w/setting to enhance	2
	30			Effecting information flow patterns		4
		01			Define project information flow policies	3
		05			Define lines of communications	1
	31			Diffusing information within project		6
		01			Plan/conduct staff meetings/conferences	3
		04			Lead/participate in task-oriented groups	1
		09			Keep involved personnel informed generally	2
	33			Effecting decision mechanisms		9
		01			Specify/determine key decision points	1
		02			Specify kinds of decisions at each level	3
		03			Make decisions	3
		06			Specify vehicles for decision-making	2
27			Data (including printouts)			13
	01			Clarifying problem addressed		8
		03			Specify variables to be studied	2
		10			Determine priorities of problems	2
		12			Review of/Familiarization w/materials	3
		13			Obtain literature relevant to problem	1
	02			Formulating objectives		4
		02			Conceptualize the product and context	2
		05			State problem in context of theory	1
		07			Confer with colleagues/others re objects	1

APPENDIX 14

(Continued)

Coding Sets DE	 NO	 QR	Output and Work Requirement Categories Cluster Output Category	 Task Cluster Category	 Primary Category of Task	Freq.
	03			Designing the output		11
		02			Isolate contaminating variables	2
		05			Specify/select grouping/sampling	2
		06			Specify treatments/procedures/strategies	1
		09			Visualize/specify format/appearance	1
		10			Specify/identify character of materials	2
		12			Estab tolerances/effectiveness criteria	2
		23			Consider/design alternatives approaches	1
	04			Producing the output		20
		01			Construct/assemble measurement tools	2
		02			Construct/assemble components of output	9
		05			Produce output	2
		08			Select/produce data processing/handling	1
		12			Invent new production method/instrument	1
		13			Construct/employ production tools/aids	4
		16			Coach talent (filming, video, sound)	1
	05			Collecting/processing data		60
		01			Conduct/operate program to be measured	1
		02			Administer/Implement data instruments	14
		03			Record/score/classify/code raw data	14
		04			Transfer raw data into storage form	5
		05			Translate data into processing form	4
		06			Perform analyses as specified/indicated	4
		07			Compile computational data	4
		08			Prepare supporting documentation	1
		09			Interpret data	11
		10			Acquire artifacts	1
		11			Try out output/component for operability	1
	06			Assessing the output quality		17
		01			Check output against specifications	1
		02			Judge significance of performance result	1
		05			Identify unexpected/incongruent outcomes	1

APPENDIX 14

(Continued)

Coding Sets			Output and Work Requirement Categories			Freq.
DE	NO	QR	Cluster Output Category	Task Cluster Category	Primary Category of Task	
		07			Judge output effectiveness/consistency	1
		08			Determine inadequate output components	4
		10			Confirm operability/validity of tools	1
		11			Judge effectiveness of data gathering	1
		12			Relate data to decision situations	1
		14			Note/make advisable modification(s)	4
		15			Proofread/edit written material	2
	07			Diffusing the output		3
		15			Provide for user training as required	2
		17			Distribute output/component	1
	21			Procuring professional staff		17
		07			Make vacancies known	1
		09			Interview/screen candidates	1
		10			Select/Hire/Appoint personnel	4
		11			Provide training as appropriate	10
		13			Determine manpower needs	1
	22			Effecting accountability		10
		04			Establish/Maintain time lines	1
		05			Project cost estimates	2
		12			Explicate procedures/strategies/duties	1
		17			Maintain duplicate records/files	1
		18			Insure optimal use of resources	1
		19			Maintain materials/use/fiscal records	3
		28			Specify/Establish/Adopt policies	1
	23			Procuring systems/services		6
		02			Determine facilities/field material req	1
		04			Select/obtain sites/facilities/services	1
		07			Arrange visitation/schedule as needed	3
		09			Procure required tools/equipment	1
	24			Effecting quality control		9
		04			Specify/develop improvement procedures	1

APPENDIX 14

(Continued)

Coding Sets			Output and Work Requirement Categories			Freq.
DE	NO	QR	Cluster Output Category	Task Cluster Category	Primary Category of Task	
		06			Monitor adherence to output specs	3
		07			Monitor personnel performance	2
		08			Monitor training effectiveness	1
		10			Monitor progress/status of work	1
		17			Direct/request critiques from others	1
	29			Facilitating relationships		17
		04			Interact w/setting to elicit cooperation	3
		05			Communicate behavior required of setting	4
		06			Explain/Prepare rationale for procedure to site	1
		10			Promote or maintain focus of effort	2
		14			Interact with setting to colloraborate	3
		16			Make materials/experiences available	4
	30			Effecting information flow patterns		2
		03			Insure that key decision points get info	2
	31			Diffusing information within project		8
		01			Plan/conduct staff meetings/conferences	1
		02			Make formal presentations	1
		03			Produce/circulate bulletins/memos/news	2
		04			Lead/participate in task-oriented groups	1
		09			Keep involved personnel informed generally	3
	33			Effecting decision mechanisms		2
		03			Make decisions	2
32			Recruiting/Placing Staff			14
	01			Clarifying problem addressed		5
		08			Determine problems to be addressed	1
		11			Visualize application of technique/ideas	4
	03			Designing the output		4
		08			Translate objectives/data into meaning	4
	21			Procuring professional staff		55

APPENDIX 14

(Continued)

Coding Sets			Output and Work Requirement Categories			
DE	NO	QR	Cluster Output Category	Task Cluster Category	Primary Category of Task	Freq.
		01			Analyze work for competencies required	3
		02			Determine competencies available	4
		03			Formulate job descriptions/qualif/salary	1
		06			Maintain list of replacement personnel	1
		07			Make vacancies known	4
		08			Identify potential candidates	9
		09			Interview/screen candidates	13
		10			Select/Hire/Appoint personnel	7
		12			Negotiate w/candidate to employ/partic	5
		13			Determine manpower needs	2
		15			Recommend personnel for employment	2
		16			Obtain approval to hire	1
		18			Obtain/Assess candidate's goals	1
		19			Review opns relative to existing staff	1
		20			Confer w/others re candidate selection	1
	22			Effecting accountability		12
		02			Delegate responsibilities/authority	3
		03			Determine/verify/monitor budget balances	2
		04			Establish/Maintain time lines	1
		11			Explicate obj/outputs to be produced	1
		12			Explicate procedures/strategies/duties	5
	23			Procuring systems/services		27
		01			Determine tasks/services to be performed	2
		03			Identify/study possible sites/services	6
		04			Select/obtain sites/facilities/services	1
		05			Negotiate contract/coop w/sites/services	17
		08			Make public service/material/site needs	1
	24			Effecting quality control		4
		05			Delegate quality control responsibility	1
		07			Monitor personnel performance	1
		10			Monitor progress/status of work	1
		11			Proof/critique products/performances	1
	25			Maintaining job satisfaction		13

APPENDIX 14

(Continued)

Coding Sets			Output and Work Requirement Categories			
DE	NO	QR	Cluster Output Category	Task Cluster Category	Primary Category of Task	Freq.
		01			Specify/explain agency/project position	12
		05			Adjust tasks to fit interests/limits	1
	26			Facilitating growth of staff		1
		01			Provide for guidance within project	1
	28			Maintaining equity among staff		3
		01			Set demands in keeping with competencies	1
		02			Determine excessive/low work loads	2
	29			Facilitating relationships		2
		05			Communicate behavior required of setting	1
		13			Maintain contacts with field	1
	30			Effecting information flow patterns		1
		03			Insure that key decision points get info	1
	33			Effecting decision mechanisms		1
		03			Make decisions	1
33			Collecting/Analyzing Data			4
	01			Clarifying problem addressed		2
		04			Identify contaminating variables	1
		10			Determine priorities of problems	1
	02			Formulating objectives		2
		07			Confer with colleagues/others re objects	2
	03			Designing the output		2
		05			Specify/select grouping/sampling	1
		10			Specify/identify character of materials	1
	04			Producing the output		12
		02			Construct/assemble components of output	3

APPENDIX 14

(Continued)

Coding Sets			Output and Work Requirement Categories			Freq.
DE	NO	QR	Cluster Output Category	Task Cluster Category	Primary Category of Task	
		04			Secure/select required materials/comps	1
		08			Select/produce data processing/handling	5
		12			Invent new production method/instrument	1
		13			Construct/employ production tools/aids	2
	05			Collecting/processing data		4
		02			Administer/Implement data instruments	1
		04			Transfer raw data into storage form	1
		07			Compile computational data	2
	06			Assessing the output quality		11
		01			Check output against specifications	5
		05			Identify unexpected/incongruent outcomes	1
		07			Judge output effectiveness/consistency	1
		08			Determine inadequate output components	2
		14			Note/make advisable modification(s)	2
	07			Diffusing the output		1
		17			Distribute output/component	1
	22			Effecting accountability		3
		04			Establish/Maintain time lines	1
		05			Project cost estimates	1
		17			Maintain duplicate records/files	1
	24			Effecting quality control		5
		07			Monitor personnel performance	1
		09			Initiate/Direct quality control action	1
		11			Proof/critique products/performances	2
		23			Confirm accuracy of data inputs/outputs	1
	25			Maintaining job satisfaction		2
		01			Specify/explain agency/project position	2
	29			Facilitating relationships		1
		14			Interact with setting to collaborate	1

APPENDIX 14

(Continued)

Coding Sets			Output and Work Requirement Categories			Freq.
DE	NO	QR	Cluster Output Category	Task Cluster Category	Primary Category of Task	
	30			Effecting information flow patterns		2
		03			Insure that key decision points get info	2
	31			Diffusing information within project		4
		12			Refer problem to appropriate specialists	1
		15			Advise technically within expertise	3
	33			Effecting decision mechanisms		1
		09			Request support for decisions made	1

APPENDIX 15

A Summary of the Knowledges, Skills, and Sensitivities Used in Producing the Outputs Classified with Frequently Used Output Cluster Categories

Coding Sets DE	S	UV	Output and Work Requirement Categories: Cluster Output Category	Structure of Enabler	Primary Category of Enabler	Freq.
01			Reports/Contracts			26
	1			Knowledge		102
		01			Standard school subjects	3
		02			Subjects learned in courses	8
		03			Subjects related to RDD&E	21
		04			Technical/professional topics	19
		05			Project focus topics, external	6
		06			Project variables: external	14
		07			Project operation: general	5
		08			Project operation: specific	6
		09			Scheduling and organizing	3
		11			Fiscal matters	2
		12			Resources: personnel	2
		16			Guidelines for reporting	4
		17			Writing styles	1
		19			Technical terminology/language	2
		21			Management techniques	2
		22			Use of equipment/systems	1
		23			Char's of target audience	1
		24			Process implementation (proj)	1
		30			Errors in strategies/judgment	1
	2			Skill (or ability to perform)		140
		01			Teaching	3
		02			Facilitating people interactions	11
		04			Using/applying feedback	4
		05			Programming project events	5
		06			Programming subject matter	1
		09			Analytical problem solving	3
		10			Analytical data handling	13
		11			Disciplining self	3
		13			Listening	3
		14			Writing	26

APPENDIX 15

(Continued)

Coding Sets			Output and Work Requirement Categories			Freq.
DE	S	UV	Cluster Output Category	Structure of Enabler	Primary Category of Enabler	
		15			Presenting orally	2
		17			Interpreting language	4
		18			Finding fits integrating	14
		19			Planning/conceptualizing	4
		20			Exercising judgment	4
		21			Tracking activities/goals	2
		22			Estimating expenses/resources	1
		24			Explicating goals/procedures	2
		25			Applying measurement tools	12
		27			Using equipment/systems	7
		29			Getting others to perform	3
		30			Adapting to situation/demands	3
		31			Taking another's perspective	1
		32			Identifying/correcting errors	1
		34			Coordinating activities	1
		35			Communicating clearly	3
		44			Fiscal accounting	1
		45			Assessing personal performance	2
		47			Recalling	1
	3			Sensitivity (or awareness)		73
		01			Values of self and others	1
		02			Capabilities and limitations	4
		03			Needs of self and others	5
		04			Interactions of self and others	7
		05			Context of subject matter	3
		07			Context of objectives	1
		09			Awareness of alternatives	1
		10			Awareness of structure	2
		13			Language barriers	1
		15			Degress of freedom to deviate	4
		16			Existing value systems	3
		17			Personality of others	3
		18			Potential conflict of interest	1
		19			Supportiveness required	1
		20			Unstated obligations	1

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(Continued)

Coding Sets	Output and Work Requirement Categories	Freq.
DE S UV	Cluster Output Category Structure of Enabler Primary Category of Enabler	
21	Limitations of analyses/data	1
22	Responses of target audiences	6
23	Cost/benefit factors	2
24	Sources of error	2
25	Individual differences	3
27	Acceptability of output	4
30	Response sets of target audiences	3
33	Need for excellence in work	2
36	Feeling of personal security	1
38	Emerging directions	1
40	Contractual/stated obligations	2
41	Inquisitiveness	1
42	Enthusiasm	2
44	Interested in activities	1
55	Respect for/trust in others	4
02	Data Instruments/Techniques	20
1	Knowledge	79
01	Standard school subjects	1
02	Subjects learned in courses	1
03	Subjects related to RDD&E	22
04	Technical/professional topics	3
05	Project focus topics, external	5
06	Project variables: external	8
07	Project operation: general	2
08	Project operation: specific	16
11	Fiscal matters	1
12	Resources: personnel	2
14	Resources: time	1
17	Writing styles	1
19	Technical terminology/language	1
22	Use of equipment/systems	4
23	Char's of target audience	3
24	Process implementation (proj)	6
25	Sources of info/materials	1
28	Group dyn/decision processes	1

APPENDIX 15

(Continued)

Coding Sets			Output and Work Requirement Categories			Freq.
DE	S	UV	Cluster Output Category	Structure of Enabler	Primary Category of Enabler	
	2			Skill (or ability to perform)		47
		01			Teaching	1
		02			Facilitating people interactions	7
		05			Programming project events	1
		06			Programming subject matter	1
		11			Disciplining self	2
		14			Writing	5
		17			Interpreting language	2
		18			Finding fits integrating	3
		19			Planning/conceptualizing	5
		21			Tracking activities/goals	2
		23			Persuading/justifying	1
		25			Applying measurement tools	1
		26			Locating/maintaining info	2
		28			Running task oriented meetings	1
		31			Taking another's perspective	2
		34			Coordinating activities	1
		35			Communicating clearly	6
		38			Using resources effectively	1
		39			Constructing measurement tools	3
	3			Sensitivity (or awareness)		35
		02			Capabilities and limitations	4
		03			Needs of self and others	1
		04			Interactions of self and others	2
		06			Worth in disciplines/methods	2
		13			Language barriers	1
		16			Existing value systems	2
		18			Potential conflict of interest	1
		21			Limitations of analyses/data	1
		22			Responses of target audiences	1
		23			Cost/benefit factors	1
		24			Sources of error	1
		30			Response sets of target audiences	3
		31			Nature/scope of output	2
		33			Need for excellence in work	2
		34			Willingness to accept guidance	1

APPENDIX 15

(Continued)

Coding Sets DE	S	UV	Output and Work Requirement Categories: Cluster Output Category / Structure of Enabler / Primary Category of Enabler	Freq.
		35	Need to communicate effectively	1
		36	Feeling of personal security	1
		38	Emerging directions	2
		41	Inquisitiveness	1
		42	Enthusiasm	1
		44	Interested in activities	2
		47	Willingness to work as needed	1
		56	Habit of thoroughness	1
04			Work Specifications/Procedures	21
	1		Knowledge	94
		01	Standard school subjects	3
		02	Subjects learned in courses	7
		03	Subjects related to RDD&E	12
		04	Technical/professional topics	18
		05	Project focus topics, external	5
		06	Project variables: external	10
		07	Project operation: general	6
		08	Project operation: specific	10
		09	Scheduling and organizing	6
		10	Staff status/responsibilities	1
		12	Resources: personnel	1
		17	Writing styles	1
		18	Staff competencies/interests	2
		21	Management techniques	2
		22	Use of equipment/systems	3
		23	Char's of target audience	2
		24	Process implementation (proj)	2
		25	Sources of info/materials	2
		27	Potential field settings	1
	2		Skill (or ability to perform)	59
		01	Teaching	2
		02	Facilitating people interactions	8
		05	Programming project events	3
		06	Programming subject matter	3
		08	Analytical reading/study	2

APPENDIX 15

(Continued)

Coding Sets			Output and Work Requirement Categories	
DE	S	UV	Cluster Output Category Structure of Enabler Primary Category of Enabler	Freq.
		09	Analytical problem solving	2
		10	Analytical data handling	2
		11	Disciplining self	3
		14	Writing	7
		15	Presenting orally	1
		17	Interpreting language	2
		18	Finding fits integrating	12
		19	Planning/conceptualizing	3
		20	Exercising judgment	1
		24	Explicating goals/procedures	2
		27	Using equipment/systems	1
		31	Taking another's perspective	2
		32	Identifying/correcting errors	1
		35	Communicating clearly	1
		40	Defining terms/problems	1
	3		Sensitivity (or awareness)	32
		01	Values of self and others	2
		02	Capabilities and limitations	5
		05	Context of subject matter	2
		10	Awareness of structure	3
		14	Reality in goal setting	1
		16	Existing value systems	3
		17	Personality of others	1
		21	Limitations of analyses/data	1
		22	Responses of target audiences	3
		27	Acceptability of output	1
		30	Response sets of target audiences	3
		31	Nature/scope of output	3
		35	Need to communicate effectively	1
		42	Enthusiasm	1
		43	Challenged by activities	1
		44	Interested in activities	1
08			Plans/Designs/Theories/Models	26
	1		Knowledge	91
		01	Standard school subjects	2

APPENDIX 15

(Continued)

Coding Sets			Output and Work Requirement Categories			Freq.
DE	S	UV	Cluster Output Category	Structure of Enabler	Primary Category of Enabler	
		02			Subjects learned in courses	1
		03			Subjects related to RDD&E	35
		04			Technical/professional topics	13
		05			Project focus topics, external	4
		06			Project variables: external	16
		07			Project operation: general	3
		08			Project operation: specific	4
		12			Resources: personnel	3
		18			Staff competencies/interests	3
		22			Use of equipment/systems	2
		23			Char's of target audience	2
		25			Sources of info/materials	1
		27			Potential field settings	2
	2			Skill (or ability to perform)		68
		01			Teaching	2
		02			Facilitating people interactions	8
		05			Programming project events	2
		06			Programming subject matter	1
		07			Programming technical equip	2
		08			Analytical reading/study	1
		09			Analytical problem solving	4
		10			Analytical data handling	4
		11			Disciplining self	3
		13			Listening	1
		14			Writing	5
		17			Interpreting language	5
		18			Finding fits integrating	6
		19			Planning/conceptualizing	6
		20			Exercising judgment	1
		21			Tracking activities/goals	1
		22			Estimating expenses/resources	1
		23			Persuading/justifying	2
		24			Explicating goals/procedures	1
		25			Applying measurement tools	1
		27			Using equipment/systems	4
		30			Adapting to situation/demands	2
		33			Graphically illustrating	2
		35			Communicating clearly	1

APPENDIX 15

(Continued)

Coding Sets	Output and Work Requirement Categories	Freq.
DE	Cluster Output Category	
S	Structure of Enabler	
UV	Primary Category of Enabler	
37	Assessing skills/potential	1
39	Constructing measurement tools	1
3	Sensitivity (or awareness)	90
01	Values of self and others	6
02	Capabilities and limitations	12
03	Needs of self and others	4
04	Interactions of self and others	1
06	Worth in disciplines/methods	4
07	Context of objectives	2
08	Worth in objectives	1
09	Awareness of alternatives	3
10	Awareness of structure	5
11	Awareness of method	3
12	Role of catalyst/synthesizer	1
13	Language barriers	1
14	Reality in goal setting	2
16	Existing value systems	15
17	Personality of others	2
18	Potential conflict of interest	2
21	Limitations of analyses/data	3
22	Responses of target audiences	2
24	Sources of error	1
26	Recognition of data needs	1
27	Acceptability of output	1
28	Admitting error/adapting	1
29	Willingness to experiment	2
30	Response sets of target audiences	2
31	Nature/scope of output	6
34	Willingness to accept guidance	1
38	Emerging directions	1
40	Contractual/stated obligations	1
47	Willingness to work as needed	1
48	Common sense	1
54	Manageability of data	1
57	Deadlines	1

APPENDIX 15

(Continued)

Coding Sets DE S UV	Output and Work Requirement Categories Cluster Output Category Structure of Enabler Primary Category of Enabler	Freq.
20	Cooperative Relationships	12
1	Knowledge	22
04	Technical/professional topics	3
05	Project focus topics, external	2
06	Project variables: external	11
08	Project operation: specific	1
09	Scheduling and organizing	2
10	Staff status/responsibilities	2
23	Char's of target audience	1
2	Skill (or ability to perform)	25
02	Facilitating people interactions	7
03	Translating content to media	2
05	Programming project events	1
12	Disciplining others	1
15	Presenting orally	2
17	Interpreting language	1
18	Finding fits integrating	1
20	Exercising judgment	1
21	Tracking activities/goals	1
23	Persuading/justifying	1
24	Explicating goals/procedures	2
29	Getting others to perform	2
34	Coordinating activities	1
37	Assessing skills/potential	2
3	Sensitivity (or awareness)	25
01	Values of self and others	3
02	Capabilities and limitations	3
03	Needs of self and others	2
04	Interactions of self and others	2
10	Awareness of structure	1
13	Language barriers	3
16	Existing value systems	4
17	Personality of others	2
18	Potential conflict of interest	1
19	Supportiveness required	1

APPENDIX 15

(Continued)

Coding Sets	Output and Work Requirement Categories	Freq.
DE S UV	Cluster Output Category Structure of Enabler Primary Category of Enabler	
34	Willingness to accept guidance	1
35	Need to communicate effectively	1
37	Willingness to delegate	1
21	Working Environment/Atmosphere	15
[illegible]	Knowledge	23
05	Project focus topics, external	1
06	Project variables: external	2
07	Project operation: general	2
09	Scheduling and organizing	1
10	Staff status/responsibilities	4
12	Resources: personnel	6
18	Staff competencies/interests	2
21	Management techniques	1
24	Process implementation (proj)	1
25	Sources of info/materials	1
28	Group dyn/decision processes	2
	Skill (or ability to perform)	24
01	Teaching	1
02	Facilitating people interactions	2
05	Programming project events	5
09	Analytical problem solving	1
11	Disciplining self	2
13	Listening	1
18	Finding fits integrating	2
19	Planning/conceptualizing	1
21	Tracking activities/goals	1
23	Persuading/justifying	1
24	Explicating goals/procedures	1
29	Getting others to perform	1
34	Coordinating activities	2
37	Assessing skills/potential	2
38	Using resources effectively	1
3	Sensitivity (or awareness)	38
01	Values of self and others	2

APPENDIX 15

(Continued)

Coding Sets			Output and Work Requirement Categories			Freq.
DE	S	UV	Cluster Output Category	Structure of Enabler	Primary Category of Enabler	
		02			Capabilities and limitations	2
		03			Needs of self and others	8
		08			Worth in objectives	1
		10			Awareness of structure	1
		16			Existing value systems	2
		17			Personality of others	3
		18			Potential conflict of interest	3
		19			Supportiveness required	2
		20			Unstated obligations	2
		22			Responses of target audiences	1
		25			Individual differences	1
		29			Willingness to experiment	1
		30			Response sets of target audiences	1
		35			Need to communicate effectively	1
		36			Feeling of personal security	1
		37			Willingness to delegate	2
		47			Willingness to work as needed	2
		55			Respect for/trust in others	1
		58			Willingness to support staff	1
27			Data (including printouts)			13
	1			Knowledge		50
		02			Subjects learned in courses	2
		03			Subjects related to RDD&E	11
		04			Technical/professional topics	5
		05			Project focus topics, general	6
		06			Project variables: external	7
		07			Project operation: general	4
		08			Project operation: specific	5
		09			Scheduling and organizing	1
		12			Resources: personnel	1
		22			Use of equipment/systems	1
		23			Char's of target audience	1
		24			Process implementation (proj)	6
	2			Skill (or ability to perform)		44
		02			Facilitating people interactions	3

APPENDIX 15

(Continued)

Coding Sets DE S UV	Output and Work Requirement Categories Cluster Output Category Structure of Enabler Primary Category of Enabler	Freq.
04	Using/applying feedback	1
05	Programming project events	1
06	Programming subject matter	1
10	Analytical data handling	2
[illegible]	Disciplining self	5
[illegible]	Writing	3
[illegible]	Finding fits integrating	4
[illegible]	Planning/conceptualizing	3
20	Exercising judgment	4
[illegible]	Estimating expenses/resources	1
[illegible]	Persuading/justifying	1
[illegible]	Applying measurement tools	7
[illegible]	Locating/maintaining info	1
[illegible]	Getting others to perform	1
[illegible]	Adapting to situation/demands	1
[illegible]	Identifying/correcting errors	1
[illegible]	Assessing skills/potential	1
[illegible]	Using resources effectively	1
[illegible]	Constructing measurement tools	1
[illegible]	Instilling confidence	1
[illegible]	Sensitivity (or awareness)	42
01	Values of self and others	1
02	Capabilities and limitations	3
03	Needs of self and others	2
04	Interactions of self and others	3
06	Worth in disciplines/methods	1
[illegible]	Reality in goal setting	1
[illegible]	Degress of freedom to deviate	1
[illegible]	Existing value systems	1
[illegible]	Limitations of analyses/data	5
22	Responses of target audiences	6
24	Sources of error	2
25	Individual differences	1
26	Recognition of data needs	3
30	Response sets of target audiences	1
31	Nature/scope of output	3

APPENDIX 15

(Continued)

Coding Sets			Output and Work Requirement Categories			Freq.
DE	S	UV	Cluster Output Category	Structure of Enabler	Primary Category of Enabler	
		34			Willingness to accept guidance	1
		35			Need to communicate effectively	1
		37			Willingness to delegate	1
		39			Limits of "one-shot" efforts	1
		40			Contractual/stated obligations	2
		47			Willingness to work as needed	2
32			Recruiting/Placing Staff			14
	1			Knowledge		51
		01			Standard school subjects	1
		03			Subjects related to RDD&E	2
		04			Technical/professional topics	3
		05			Project focus topics, external	2
		06			Project variables: external	10
		07			Project operation: general	1
		08			Project operation: specific	9
		09			Scheduling and organizing	4
		10			Staff status/responsibilities	3
		12			Resources: personnel	15
		16			Guidelines for reporting	1
	2			Skill (or ability to perform)		14
		02			Facilitating people interactions	1
		05			Programming project events	1
		08			Analytical reading/study	1
		14			Writing	1
		15			Presenting orally	1
		17			Interpreting language	1
		18			Finding fits integrating	1
		20			Exercising judgment	1
		23			Persuading/justifying	6
	3			Sensitivity (or awareness)		21
		01			Values of self and others	2
		02			Capabilities and limitations	6
		03			Needs of self and others	1
		07			Context of objectives	1

APPENDIX 15

(Continued)

Coding Sets DE S UV	Output and Work Requirement Categories Cluster Output Category Structure of Enabler Primary Category of Enabler	Freq.
11	Awareness of method	1
16	Existing value systems	1
17	Personality of others	1
18	Potential conflict of interest	1
25	Individual differences	1
26	Recognition of data needs	1
28	Admitting error/adapting	1
30	Response sets of target audiences	4
[illegible]	Collecting/Analyzing Data	4
[illegible]	Knowledge	21
03	Subjects related to RDD&E	4
04	Technical/professional topics	4
06	Project variables: external	1
07	Project operation: general	3
08	Project operation: specific	3
09	Scheduling and organizing	1
19	Technical terminology/language	2
[illegible]	Use of equipment/systems	2
[illegible]	Char's of target audience	1
	Skill (or ability to perform)	15
01	Teaching	1
05	Programming project events	1
07	Programming technical equip	2
08	Analytical reading/study	1
17	Interpreting language	2
22	Persuading/justifying	1
24	Explicating goals/procedures	1
[illegible]	Using equipment/systems	3
29	Getting others to perform	1
30	Adapting to situation/demands	1
38	Using resources effectively	1
3	Sensitivity (or awareness)	6
[illegible]	Interactions of self and others	1

APPENDIX 15

(Continued)

Coding Sets	Output and Work Requirement Categories	Freq.
DE	Cluster Output Category	
S	Structure of Enabler	
UV	Primary Category of Enabler	
19	Supportiveness required	1
21	Limitations of analyses/data	1
24	Sources of error	1
36	Feeling of personal security	1
38	Emerging directions	1

APPENDIX 16

Illustrations of the Standards Associated with Primary Categories of Outputs

Coding Sets	Output and Work Requirement Categories	Freq.
DE	Cluster Output Category	
FGHI	Primary Output Category	
NO	Structure of Standards	
QR	Primary Category of Standard	
01	Reports/Contracts	26
0006	Terminal Report	2
1	Output Standards	11
01	Completeness of content	1
12	Goal attainment	1
14	Acceptance by sponsor	1
15	Compliance w/sponsor guideline	1
16	Compares favorably	3
18	Satisfactory appearance	1
19	Logical criteria	2
24	Terminology appropriate	1
2	Process Standards	1
20	Performance respected	1
0007	Proposal	3
1	Output Standards	5
07	Personal satisfaction/feeling	1
08	Agreement/concurrence w/others	1
09	Lack of errors/discrepancies	1
14	Acceptance by sponsor	1
17	Internally consistent	1
0158	Evaluation Report	5
1	Output Standards	24
01	Completeness of content	1
02	Quantity of outputs/data	1
04	Communication and clarity	1
05	Utility or value	2
08	Agreement/concurrence w/others	2

APPENDIX 16

(Continued)

Coding Sets	Output and Work Requirement Categories Cluster Output Category Primary Output Category Structure of Standards Primary Category of Standard	Freq.
[illegible]	Lack of errors/discrepancies	2
11	Appropriate design/content	3
[illegible]	Goal attainment	4
[illegible]	Acceptance by others (in proj)	4
[illegible]	Satisfactory appearance	1
	Sources of variance controlled	2
	Meets design expectations	1
	Process Standards	10
[illegible]	Personnel are satisfied	1
	Deadlines are met	3
[illegible]	Performance respected	1
	Staff reflect trust	1
[illegible]	Impact of effort favorable	2
[illegible]	Outputs distributed/requested	1
	Evidence of pre-planning	1
	Specifications/Procedures	21
	Description/Specs for Output	3
	Output Standards	8
[illegible]	Completeness of content	1
[illegible]	Communication and clarity	1
07	Personal satisfaction/feeling	1
[illegible]	Agreement/concurrence w/others	1
	Goal attainment	1
[illegible]	Acceptance by others (in proj)	1
	Internally consistent	2
022[illegible]	Data Analysis Procedures	3
1	Output Standards	3
[illegible]	Utility or value	1
1[illegible]	Appropriate design/content	1
[illegible]	Acceptance by others (in proj)	1

APPENDIX 16

(Continued)

Coding Sets				Output and Work Requirement Categories	Freq.
DE	FGHI	NO	QP	Cluster Output Category Primary Output Category Structure of Standards Primary Category of Standard	
		2		Process Standards	1
			14	No felt deficiencies	1
	0222			Data Collection Procedures	2
		1		Output Standards	8
			02	Quantity of outputs/data	1
			03	Quantity of effort expended	1
			04	Communication and clarity	1
			07	Personal satisfaction/feeling	1
			12	Goal attainment	1
			13	Acceptance by others (in proj)	1
			22	Functions as planned	2
		2		Process Standards	2
			24	Costs acceptable for benefits	1
			34	Impact of effort favorable	1
27				Data (including printouts)	13
	0199			Item Analysis Data	2
		1		Output Standards	20
			01	Completeness of content	1
			04	Communication and clarity	2
			05	Utility or value	5
			06	Acceptance by users	1
			07	Personal satisfaction/feeling	2
			08	Agreement/concurrence w/others	1
			09	Lack of errors/discrepancies	1
			12	Goal attainment	1
			13	Acceptance by others (in proj)	3
			18	Satisfactory appearance	1
			19	Logical criteria	1
			28	Operable by others	1

APPENDIX 16

(Continued)

Coding Sets DE FGHI NO QR	Output and Work Requirement Categories Cluster Output Category Primary Output Category Structure of Standards Primary Category of Standard	Freq.
2	Process Standards	3
14	No felt deficiencies	3
[illegible]	Baseline Data	1

APPENDIX 17

Illustrations of the Tasks Associated with Primary Categories of Outputs

Coding Sets				Output and Work Requirement Categories				
DE	FGHI	NO	QR	Cluster Output Category	Primary Output Category	Task Cluster Category	Primary Category of Task	Freq.
01				Reports/Contracts				26
	0006				Terminal Report			2
		21				Procuring professional staff		1
			01				Analyze work for competencies required	1
		04				Producing the output		3
			04				Secure/select required materials/comps	1
			05				Produce output	2
		05				Collecting/processing data		1
			09				Interpret data	1
		01				Clarifying Problem Addressed		1
			12				Review of/Familiarization w/materials	1
		06				Assessing the output quality		2
			15				Proofread/edit written material	2
	0007				Proposal			3
		01				Clarifying Problem Addressed		3
			02				Specify context/scope/limits of effort	1
			06				Observe relevant/related field opns	1
			12				Review of/Familiarization w/materials	1
		02				Formulating objectives		3
			02				Conceptualize the product and context	1
			07				Confer with colleagues/others re objects	2

APPENDIX 17

(Continued)

Coding Sets DE	FGHI	NO	QR	Output and Work Requirement Categories: Cluster Output Category / Primary Output Category / Task Cluster Category / Primary Category of Task	Freq.
		03		Designing the output	3
			03	Determine relation of variables/compnts	1
			07	Conceptualize output application	1
			20	State overall design	1
		21		Procuring professional staff	5
			01	Analyze work for competencies required	1
			03	Formulate job descriptions/qualif/salary	2
			13	Determine manpower needs	1
			14	Determine tasks to procure staff	1
	0158			Evaluation Report	5
		01		Clarifying Problem Addressed	5
			03	Specify variables to be studied	2
			07	Identify characteristics tgt population	1
			12	Review of/Familiarization w/materials	2
		02		Formulating objectives	4
			03	Formulate specific questions/hypotheses	2
			04	Determine nature of msmt objectives	1
			07	Confer with colleagues/others re objects	1
		03		Designing the output	10
			03	Determine relation of variables/compnts	1
			05	Specify/select grouping/sampling	1
			06	Specify treatments/procedures/strategies	3
			08	Translate objectives/data into meaning	1
			09	Visualize/specify format/appearance	1
			10	Specify/identify character of materials	1
			17	Specify measures to be used	1
			19	Specify kind of data analysis to be used	1
		04		Producing the output	20

APPENDIX 17

(Continued)

Coding Sets	Output and Work Requirement Categories	Freq.
DE FGHI NO QR	Cluster Output Category Primary Output Category Task Cluster Category Primary Category of Task	
01	Construct/assemble measurement tools	7
02	Construct/assemble components of output	7
05	Produce output	4
13	Construct/employ production tools/aids	1
18	Provide materials to producers	1
05	Collecting/processing data	10
02	Administer/Implement data instruments	1
03	Record/score/classify/code raw data	2
07	Compile computational data	1
09	Interpret data	4
11	Try out output/component for operability	1
19	Specify/identify data identity codes	1
06	Assessing the output quality	17
03	Determine achievement of objectives	1
10	Confirm operability/validity of tools	4
11	Judge effectiveness of data gathering	1
14	Note/make advisable modification(s)	6
15	Proofread/edit written material	5
07	Diffusing the output	2
17	Distribute output/component	2
21	Procuring professional staff	1
10	Select/Hire/Appoint personnel	1
22	Effecting accountability	17
04	Establish/Maintain time lines	4
10	Report status as required/appropriate	3
12	Explicate procedures/strategies/duties	1
14	Issue production orders	2
21	Develop record keeping system	1

APPENDIX 17

(Continued)

Coding Sets				Output and Work Requirement Categories				
DE	FGHI	NO	QR	Cluster Output Category	Primary Output Category	Task Cluster Category	Primary Category of Task	Freq.
			22				Estimate/Provide material/personnel	1
			27				Monitor/Determine cost-effectiveness	1
			28				Specify/Establish/Adopt policies	2
			30				Obtain staff input regarding time/funds	1
			31				Participate in production efforts as req	1
		23				Procuring systems/services		1
			05				Determine tasks/services to be performed	1
		24				Effecting quality control		10
			09				Initiate/Direct quality control action	1
			10				Monitor progress/status of work	2
			11				Proof/critique products/performances	3
			23				Confirm accuracy of data inputs/outputs	4
		25				Maintaining job satisfaction		2
			01				Specify/explain agency/project position	1
			03				Recognize merit	1
		26				Facilitating growth of staff		2
			06				Specify ownership/authorship policies	1
			07				Encourage publication of important work	1
		29				Facilitating relationships		16
			04				Interact w/setting to elicit cooperation	5
			14				Interact with settingto collaborate	1
			15				Interact with setting to enhance	8
			16				Make materials/experiences available	1
			17				Provide foreign language translations	1
		31				Diffusing information within project		4
			09				Keep involved personnel informed generally	1
			12				Refer problem to appropriate specialists	2
			15				Advise technically within expertise	1

APPENDIX 17

(Continued)

Coding Sets	Output and Work Requirement Categories	Freq.
DE	Cluster Output Category	
FGHI	Primary Output Category	
NO	Task Cluster Category	
QR	Primary Category of Task	
32	Diffusing information beyond project	3
04	Report project at agency/other meetings	2
11	Approve articles/papers for publication	1
04	Work Specifications/Procedures	21
0095	Description/Specs for Output	3
01	Clarifying Problem Addressed	8
02	Specify context/scope/limits of effort	1
08	Determine problems to be addressed	1
12	Review of/Familiarization w/materials	2
15	Operationally define terms/variables	4
02	Formulating objectives	1
06	Create objectives	1
03	Designing the output	6
06	Specify treatments/procedures/strategies	2
08	Translate objectives/data into meaning	1
10	Specify/identify character of materials	2
20	State overall design	1
04	Producing the output	3
02	Construct/assemble components of output	1
05	Produce output	1
14	Adapt materials for local/specific use	1
06	Assessing the output quality	4
14	Note/make advisable modification(s)	1
15	Proofread/edit written material	3
22	Effecting accountability	2
02	Delegate responsibilities/authority	1
04	Establish/Maintain time lines	1

APPENDIX 17

(Continued)

Coding Sets DE	FGHI	NO	QR	Output and Work Requirement Categories: Cluster Output Category / Primary Output Category / Task Cluster Category / Primary Category of Task	Freq.
		24		Effecting quality control	2
			10	Monitor progress/status of work	1
			18	Monitor staff awareness of responsibility	1
	0220			Data Analysis Procedures	3
		01		Clarifying Problem Addressed	2
			01	Review Problem-relevant literature/info	2
		03		Designing the output	1
			24	Visualize/Specify effect of output	1
		04		Producing the output	4
			05	Produce output	1
			08	Select/produce data processing/handling	3
		05		Collecting/processing data	17
			05	Translate data into processing form	2
			06	Perform analyses as specified/indicated	8
			07	Compile computational data	2
			08	Prepare supporting documentation	2
			09	Interpret data	1
			11	Try out output/component for operability	2
		06		Assessing the output quality	3
			01	Check output against specifications	1
			08	Determine inadequate output components	2
		22		Effecting accountability	1
			02	Delegate responsibilities/authority	1
		24		Effecting quality control	1
			07	Monitor personnel performance	1

APPENDIX 17

(Continued)

Coding Sets DE FGHI NO QR	Output and Work Requirement Categories Cluster Output Category Primary Output Category Task Cluster Category Primary Category of Task	Freq.
26	Facilitating growth of staff	3
01	Provide for guidance within project	3
29	Facilitating relationships	1
14	Interact with setting to collaborate	1
31	Diffusing information within project	2
12	Refer problem to appropriate specialists	2
0222	Data Collection Procedures	2
03	Designing the output	3
05	Specify/select grouping/sampling	1
06	Specify treatments/procedures/strategies	1
23	Consider/design alternative approaches	1
04	Producing the output	3
13	Construct/employ production tools/aids	3
05	Collecting/processing data	18
01	Conduct/operate program to be measured	2
02	Administer/Implement data instruments	5
03	Record/score/classify/code raw data	3
04	Transfer raw data into storage form	1
05	Translate data into processing form	2
06	Perform analyses as specified/indicated	3
08	Prepare supporting documentation	1
11	Try out output/component for operability	1
06	Assessing the output quality	4
11	Judge effectiveness of data gathering	1
14	Note/make advisable modification(s)	2
16	Determine adeq of implementation process	1

APPENDIX 17

(Continued)

Coding Sets				Output and Work Requirement Categories				Freq.
DE	FGHI	NO	QR	Cluster Output Category	Primary Output Category	Task Cluster Category	Primary Category of Task	
		22				Effecting accountability		1
			02				Delegate responsibilities/authority	1
		23				Procuring systems/services		1
			07				Arrange visitation/schedule as needed	1
		24				Effecting quality control		2
			17				Direct/request critiques from others	2
		29				Facilitating relationships		9
			04				Interact w/setting to elicit cooperation	4
			06				Explain/Prepare ratnle for proced to site	1
			15				Interact w/setting to enhance	3
			16				Make materials/experiences available	1
		31				Diffusing information within project		1
			09				Keep involved personnel informed generally	1
27				Data (including printouts)				13
	0199				Item Analysis Data			2
		02				Formulating objectives		1
			02				Conceptualize the produce and context	1
		03				Designing the output		1
			23				Consider/design alternative approaches	1
		04				Producing the output		5
			02				Construct/assemble components of output	4
			05				Produce output	1
		05				Collecting/processing data		8
			03				Record/score/classify/code raw data	4

APPENDIX 17

(Continued)

Coding Sets				Output and Work Requirement Categories				
DE	FGHI	NO	OR	Cluster Output Category	Primary Output Category	Task Cluster Category	Primary Category of Task	Freq.
			06				Perform analyses as specified/indicated	1
			09				Interpret data	2
			11				Try out output/component for operability	1
		21				Procuring professional staff		6
			11				Provide training as appropriate	6
		24				Effecting quality control		3
			06				Monitor adherence to output specs	1
			07				Monitor personnel performance	1
			17				Direct/request critiques from others	1
		29				Facilitating relationships		1
			14				Interact with setting to collaborate	1
		30				Effecting information flow patterns		1
			03				Insure that key decision points get info	1
		31				Diffusing information within project		1
			09				Keep involved personnel informed generally	1
		33				Effecting decision mechanisms		1
			03				Make decisions	1
	0235				Baseline Data			1
		01				Clarifying Problem Addressed		2
			03				Specify variables to be studied	1
			12				Review of/Familiarization w/materials	1
		04				Producing the output		1
			13				Construct/employ production tools/aids	1
		05				Collecting/processing data		3
			02				Administer/Implement data instruments	3

APPENDIX 17

(Continued)

Coding Sets DE FGHI NO QR	Output and Work Requirement Categories Cluster Output Category Primary Output Category Task Cluster Category Primary Category of Task	Freq.
06	Assessing the output quality	3
08	Determine inadequate output components	3
23	Procuring systems/services	1
09	Procure required tools/equipment	1
29	Facilitating relationships	2
14	Interact with setting to collaborate	2

APPENDIX 18

Illustrations of the Knowledges, Skills, and Sensitivities Associated with Primary Categories of Outputs

Coding Sets DE FGHI S UV	Output and Work Requirement Categories Cluster Output Category Primary Output Category Structure of Enabler Primary Category of Enabler	Freq.
01	Reports/Contracts	26
0006	Terminal Report	2
1	Knowledge	8
02	Subjects learned in courses	1
03	Subjects related to RDD&E	4
07	Project operation: general	1
12	Resources: personnel	1
16	Guidelines for reporting	1
2	Skill (or ability to perform)	2
10	Analytical data handling	1
14	Writing	1
3	Sensitivity (or awareness)	1
18	Potential conflict of interest	1
0007	Proposal	3
1	Knowledge	8
05	Project focus topics, external	1
06	Project variables: external	4
08	Project operation: specific	1
09	Scheduling and organizing	1
11	Fiscal matters	1
2	Skill (or ability to perform)	6
14	Writing	1
18	Finding fits integrating	2
19	Planning/conceptualizing	1
22	Estimating expenses/resources	1
24	Explicating goals/procedures	1
3	Sensitivity (or awareness)	8

APPENDIX 18

(Continued)

Coding Sets DE FGHI S UV	Output and Work Requirement Categories Cluster Output Category Primary Output Category Structure of Enabler Primary Category of Enabler	Freq.
02	Capabilities and limitations	1
03	Needs of self and others	2
04	Interactions of self and others	1
07	Context of objectives	1
09	Awareness of alternatives	1
10	Awareness of structure	2
0158	Evaluation Report	5
1	Knowledge	33
02	Subjects learned in courses	5
03	Subjects related to RDD&E	12
04	Technical/professional topics	1
05	Project focus topics, external	2
06	Project variables: external	6
07	Project operation: general	1
08	Project operation: specific	1
12	Resources: personnel	1
21	Management techniques	1
22	Use of equipment/systems	1
23	Char's of target audience	1
30	Errors in strategies/judgment	1
2	Skill (or ability to perform)	27
01	Teaching	1
02	Facilitating people interactions	4
05	Programming project events	1
09	Analytical problem solving	2
10	Analytical data handling	3
11	Disciplining self	1
14	Writing	2
17	Interpreting language	1
18	Finding fits intergrating	1
19	Planning/conceptualizing	2
20	Exercising judgment	1
24	Explicating goals/procedures	1
25	Applying measurement tools	2
29	Getting others to perform	1

APPENDIX 18

(Continued)

Coding Sets DE FGHI S UV	Output and Work Requirement Categories Cluster Output Category Primary Output Category Structure of Enabler Primary Category of Enabler	Freq.
30	Adapting to situation/demands	1
34	Coordinating activities	1
35	Communicating clearly	1
45	Assessing personal performance	1
3	Sensitivity (or awareness)	24
02	Capabilities and limitations	1
03	Needs of self and others	2
13	Language barriers	1
17	Personality of others	1
19	Supportiveness required	1
20	Unstated obligations	1
21	Limitations of analyses/data	1
22	Responses of target audiences	1
25	Individual differences	1
30	Response sets of target audiences	3
33	Need for excellence in work	2
36	Feeling of personal security	1
38	Limits of "one-shot" efforts	1
40	Contractual/stated obligations	1
42	Enthusiasm	1
44	Interested in activities	1
55	Respect for/thrust in others	4
04	Work Specifications/Procedures	21
0095	Description/Specs for Output	3
1	Knowledge	11
02	Subjects learned in courses	1
04	Technical/professional topics	7
06	Project variables: external	1
07	Project operation: general	1
08	Project operation: specific	1
2	Skill (or ability to perform)	7
08	Analytical reading/study	1

APPENDIX 18

(Continued)

Coding Sets DE	 FGHI	 S	 UV	Output and Work Requirement Categories Cluster Output Category	 Primary Output Category	 Structure of Enabler	 Primary Category of Enabler	Freq.
			09				Analytical problem solving	1
			18				Finding fits integrating	2
			20				Exercising judgment	1
			24				Explicating goals/procedures	1
			35				Communicating clearly	1
		3				Sensitivity (or awareness)		3
			01				Values of self and others	1
			10				Awareness of structure	1
			14				Reality in goal setting	1
	0220				Data Analysis Procedures			3
		1				Knowledge		17
			01				Standard school subjects	1
			02				Subjects learned in courses	2
			03				Subjects related to RDD&E	5
			04				Technical/professional topics	5
			08				Project operation: specific	1
			22				Management techniques	3
		2				Skill (or ability to perform)		6
			01				Teaching	2
			10				Analytical data handling	2
			11				Disciplining self	1
			19				Planning/conceptualizing	1
		3				Sensitivity (or awareness)		1
			21				Limitations of analyses/data	1
	0222				Data Collections Procedures			2
		1				Knowledge		5
			03				Subjects related to RDD&E	2
			06				Project variables: external	1
			21				Management techniques	2

APPENDIX 18

(Continued)

Coding Sets	Output and Work Requirement Categories	Freq.
DE	Cluster Output Category	
FGHI	Primary Output Category	
S	Structure of Enabler	
UV	Primary Category of Enabler	
2	Skill (or ability to perform)	5
02	Facilitating people interactions	3
27	Using equipment/systems	1
31	Taking another's perspective	1
3	Sensitivity (or awareness)	9
02	Capabilities and limitations	1
16	Existing value systems	1
22	Responses of target audiences	3
30	Response sets of target audiences	1
31	Nature/scope of output	1
35	Need to communicate effectively	1
44	Interested in activities	1
27	Data (including printouts)	13
0199	Item Analysis Data	2
1	Knowledge	14
02	Subjects learned in courses	1
03	Subjects related to RDD&E	5
06	Project variables: external	3
07	Project operation: general	1
08	Project operation: specific	1
22	Use of equipment/systems	1
24	Process implementation (project)	2
2	Skill (or ability to perform)	11
01	Teaching	1
05	Programming project events	1
10	Analytical data handling	1
14	Writing	2
19	Planning/conceptualizing	2
20	Exercising judgment	2
26	Locating/maintaining information	1
38	Using resources effectively	1

APPENDIX 18

(Continued)

Coding Sets	Output and Work Requirement Categories	Freq.
DE FGHI S UV	Cluster Output Category Primary Output Category Structure of Enabler Primary Category of Enabler	
3	Sensitivity (or awareness)	9
04	Interactions of self and others	1
06	Worth in disciplines/methods	1
21	Limitations of analyses/data	4
22	Responses of target audiences	2
31	Nature/scope of output	1
0235	Baseline Data	1
1	Knowledge	6
03	Subjects related to RDD&E	1
05	Project focus topics, external	3
06	Project variables: external	2
3	Sensitivity (or awareness)	1
26	Recognition of data needs	1

Appendix 19

Personnel Characteristics and Activities that Differentiate RDD&E Job Roles

Factor 1: Staff Worker (low-level data analysis and instrument development)

Characteristics of Personnel with High Positive/Negative Factor Loadings

Factor Loading	Person	Sex	Highest Degree	Relationship to Project[a]	Project Job Role[b]	Project Focus
.77	20-02	M	Bach	Reg. Staff	Member, prof	Res
.71	11-07	F	Bach	Reg. Staff	Member, prof	Devel
.68	07-07	M	Bach	Reg. Staff	Member, prof	Devel
.68	10-02	F	Bach	Reg. Staff	Member, tech	Res
.64	11-06	F	Bach	Reg. Staff	Member, prof	Devel
.63	21-02	F	Mstr	Reg. Staff	Supervisor	Diffus
.62	12-04	F	Mstr	Reg. Staff	Member, prof	Eval
.58	18-08	M	Dr	Reg. Staff	Member, prof	Eval
.57	11-08	F	Bach	Reg. Staff	Member, prof	Devel
.51	02-07	M	Mstr	Reg. Staff	Member, prof	Devel
.40	11-05	F	Bach	Reg. Staff	Member, prof	Devel
.38	18-05	F	Bach	Mgr/Specl	Member, prof	Eval
.37	14-08	(background data not available)				Res
.36	07-08	F	Bach	Reg. Staff	Member, prof	Devel
.32	11-03	M	Dr	Reg. Staff	Manager	Devel
.30	09-01	M	Dr	Reg. Staff	Prin Inves	Res
-.30	13-06	M	Dr	Adv/Consult	Adv/Consult	Devel
-.31	15-01	M	Dr	Reg. Staff	Prin Inves	Devel
-.33	18-11	M	Mstr	Reg. Staff	Manager	Eval
-.34	21-07	F	Bach	Reg. Staff	Member, prof	Diffus
-.36	21-01	M	Dr	Mgr/Specl	Prin Inves	Diffus
-.37	13-05	M	Mstr	Coop Agency		Devel
-.39	21-03	M	Mstr	Mgr/Specl	Manager	Diffus
-.39	02-05	M	Dr	Reg. Staff	Manager	Devel
-.40	18-03	M	Mstr	User Agency	Manager	Eval
-.42	08-10	M	Bach	Reg. Staff	Manager	Diffus
-.46	14-02	M	Bach	Reg. Staff	Manager	Res
-.46	21-05	F	Bach	On-call Staff	Member, prof	Diffus
-.50	18-10	M	Mstr	Reg. Staff	Manager	Eval
-.54	10-01	M	Dr	Reg. Staff	Prin Inves	Res
-.61	19-01	M	Mstr	Reg. Staff	Prin Inves	Diffus
-.61	13-01	M	Mstr	Reg. Staff	Proj Dir	Devel
-.64	17-02	M	Mstr	Mgr/Specl	Manager	Diffus
-.67	21-08	M	Dr	Mgr/Specl	Proj Dir	Diffus
-.68	17-05	M	Mstr	Reg. Staff	Proj Dir	Diffus
-.80	18-06	M	Mstr	Reg. Staff	Manager	Eval
-.83	13-04	M	Mstr	Reg. Staff	Prin Inves	Devel

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[a] See item 46 on Form 03 for full description of each category.

[b] See coding set X for full description of each category.

APPENDIX 19

(Continued)

Activity Items Differentiating Personnel With High Positive/Negative Factor Loadings

Scale Difference	Form 04 No.	Label for Activity Statement
4.7	E.2	Computing or using measures of central tendency (i.e., means, medians, modes, arithmetic average).
4.1	E.1	Preparing or using frequency tallies and/or marginal distributions (as in Chi-Square tests).
3.9	E.3	Computing or using correlation coefficients, including simple correlational analyses.
3.4	E.8	Computing item analyses of test items.
3.3	E.5	Computing and interpreting data from analysis of variance designs.
3.2	E.4	Computing and interpreting simple tests of significance of differences in observed data (such as t-tests).
3.0	E.7	Examining and interpreting non-quantified information (such as verbal responses, observed activities, etc.).
2.9	C.2	Developing test items.
2.6	E.	Analyzing data
2.4	E.6	Computing and interpreting regression analyses.
2.2	C.	Developing research tools or other information-gathering instruments.
2.2	C.1	Constructing questionnaires.
-2.1	H.4	Designing appropriate learning situations.
-2.1	F.4	Writing interim, status, or periodic reports.
-2.2	B.1	Identifying relevant variables for consideration.
-2.3	F.3	Writing major project reports.
-2.5	F.6	Writing administrative reports.
-2.8	G.4	Communicating personnel evaluations to individuals.
-2.8	G.2	Establishing contact with and participation by other personnel or agencies.
-2.8	G.5	Scheduling project activities.
-3.0	I.1	Contacts with funding sponsor or monitor of project.
-3.2	G.	Supervising and coordinating actions of others, and/or of material resources.
-3.2	B.2	Developing conceptual frameworks or general patterns of project design.
-3.5	I.2	Contacts with higher agency management for review of project.
-3.6	B.4	Organizing a coherent program of activities.
-3.6	G.1	Procurement of project staff.
-4.0	G.3	Reviewing performance of project personnel.
-4.6	G.6	Allocating responsibilities to project personnel.

Factor 2: Staff Worker (high-level statistical design, and instrument design)

Characteristics of Personnel with High Positive/Negative Factor Loadings

Factor Loading	Person	Sex	Highest Degree	Relationship to Project	Project Job Role	Project Focus
.63	18-05	F	Bach	Mgr/Specl	Member, prof	Eval
.43	16-02	F	Dr	Mgr/Specl	Member, prof	Eval
.37	11-03	M	Dr	Reg. Staff	Manager	Devel

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.34	07-03	M	Dr	Reg. Staff	Manager	Devel
.32	11-08	F	Bach	Reg. Staff	Member, prof	Devel
-.42	10-01	M	Dr	Reg. Staff	Prin Inves	Res
-.78	21-07	F	Bach	Reg. Staff	Member, prof	Diffus

Activity Items Differentiating Personnel With High Positive/Negative Factor Loadings

Scale Difference	Form 04 No.	Label for Activity Statement
5.6	B.5	Designating sampling procedures.
5.6	E.5	Computing and interpreting data from analysis of variance designs.
5.2	E.4	Computing and interpreting simple tests of significance of differences in observed data (such as t-tests).
5.1	C.4	Developing observational techniques.
5.0	E.3	Computing or using correlation coefficients, including simple correlational analyses.
4.6	E.2	Computing or using measures of central tendency (i.e., means, medians, modes, arithmetic average).
4.4	E.1	Preparing or using frequency tallies and/or marginal distributions (as in Chi-Square tests).
4.3	E.7	Examining and interpreting non-quantified information (such as verbal responses, observed activities, etc.).
4.0	E.6	Computing and interpreting regression analyses.
3.9	B.6	Designating general statistical treatment to be used.
3.7	B.7	Designing system models for computer application to data.
3.5	C.	Developing research tools or other information-gathering instruments.
3.0	E.8	Computing item analyses of test items.
2.9	B.3	Developing methodologies to be used in the project.
2.6	B.	Designing or planning procedural activities for the project.
2.5	C.1	Constructing questionnaires.
2.5	C.2	Developing test items.
2.4	C.3	Developing interview outlines and schedules.
2.0	F.	Writing.
-2.2	F.4	Writing interim, status, or periodic reports.
-2.3	F.1	Writing correspondence.
-2.4	A.4	Reading "in-house" materials and correspondence.
-2.7	H.3	Providing on-the-job training to individuals.
-3.0	F.3	Writing major project reports.
-3.2	F.7	Writing literature surveys.
-3.4	A.1	Reading recent project-related research.
-3.4	I.2	Contacts with higher agency management for review of project.
-3.5	G.5	Scheduling project activities.
-3.6	F.6	Writing administrative reports.
-3.6	G.1	Procurement of project staff.
-3.7	G.4	Communicating personnel evaluations to individuals.
-3.8	G.2	Establishing contact with and participation by other personnel or agencies.

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-4.5	G.6	Allocating responsibilities to project personnel.
-4.6	A.2	Reading scholarly essays.
-4.7	F.2	Writing research proposals.
-4.8	F.5	Writing for professional publications.
-5.4	G.3	Reviewing performance of project personnel.

Factor 3: Supervisor (high-level data analysis)

Characteristics of Personnel with High Positive/Negative Factor Loadings

Factor Loading	Person	Sex	Highest Degree	Relationship to Project	Project Job Role	Project Focus
.79	10-03	M	Dr	Reg. Staff	Proj Dir	Res
.45	18-09	M	Dr	Reg. Staff	Supervisor	Eval
.44	10-02	F	Bach	Reg. Staff	Tech Support	Res
.30	16-01	M	Dr	Mgr/Specl	Proj Dir	Eval
.30	21-02	F	Mstr	Reg. Staff	Supervisor	Diffus
-.32	17-11	F	Mstr	Reg. Staff	Member, prof	Diffus
-.51	17-12	F	Mstr	Reg. Staff	Member, prof	Diffus
-.54	15-02	M	Mstr	Reg. Staff	Manager	Devel
-.57	17-10	M	Mstr	Reg. Staff	Member, prof	Diffus
-.71	07-14	M	Mstr	Particip Agency	Manager	Devel

Activity Items Differentiating Personnel
With High Positive/Negative Factor Loadings

Scale Difference	Form 04 No.	Label for Activity Statement
4.6	E.3	Computing or using correlation coefficients, including simple correlational analyses.
4.6	E.4	Computing and interpreting simple tests of significance of differences in observed data (such as t-tests).
4.4	E.5	Computing and interpreting data from analysis of variance designs.
4.0	E.2	Computing or using measures of central tendency (i.e., means, medians, modes, arithmetic average).
3.8	E.6	Computing and interpreting regression analyses.
3.6	B.7	Designing system models for computer application to data.
3.4	B.6	Designating general statistical treatment to be used.
3.4	E.1	Preparing or using frequency tallies and/or marginal distributions (as in Chi-Square tests).
3.2	E.8	Computing item analyses of test items.
2.8	G.1	Procurement of project staff.
2.6	G.6	Allocating responsibilities to project personnel.
2.4	G.4	Communicating personnel evaluations to individuals.
2.0	G.3	Reviewing performance of project personnel.
-2.2	I.2	Contacts with higher agency management for review of project.
-2.4	A.1	Reading recent project-related research.
-2.6	A.	Reading.

(Continued)

-2.6	B.4	Organizing a coherent program of activities.
-2.6	D.3	Conducting laboratory experiments.
-2.6	D.4	Administering questionnaires.
-2.6	F.4	Writing interim, status, or periodic reports.
-2.6	F.6	Writing administrative reports.
-2.8	D.2	Surveying literature.
-2.8	D.5	Administering tests.
-2.8	H.2	Participating in conduct of seminars of workshops.
-3.0	C.3	Developing interview outlines and schedules.
-3.0	C.4	Developing observational techniques.
-3.2	D.	Collecting project data.
-3.2	C.2	Developing test items.
-3.2	F.3	Writing major project reports.
-3.4	H.	Teaching or training.
-3.4	C.1	Constructing questionnaires
-3.6	D.1	Interviewing.
-3.6	H.1	Participating in classroom instruction.
-4.0	C.	Developing research tools or other information-gathering instruments.
-5.2	H.4	Designing appropriate learning situations.

Factor 4: Manager (mid-management, with staff personnel contact)

Characteristics of Personnel with High Positive/Negative Factor Loadings

Factor Loading	Person	Sex	Highest Degree	Relationship to Project	Project Job Role	Project Focus
.88	07-05	M	Bach	Reg. Staff	Manager	Devel
.56	02-05	M	Dr	Reg. Staff	Manager	Devel
.44	07-13	F	Mstr	Reg. Staff	Member, prof	Devel
.35	13-05	M	Mstr	Partic Agency	Adv/Consult	Devel
.32	13-03	M	Mstr	Partic Agency	Adv/Consult	Devel
.32	13-01	M	Mstr	Reg. Staff	Proj Dir	Devel
.31	16-04	M	Dr	Reg. Staff	Supervisor	Eval
-.34	20-01	M	Dr	Reg. Staff	Prin Inves	Res
-.35	12-02	M	Mstr	Reg. Staff	Manager	Eval
-.51	16-02	F	Dr	Mgr/Specl	Member, prof	Eval
-.54	14-01	M	Dr	Reg. Staff	Prin Inves	Res

Activity Items Differentiating Personnel
With High Positive/Negative Factor Loadings

Scale Difference	Form 04 No.	Label for Activity Statement
5.0	F.3	Writing major project reports.
4.0	A.4	Reading "in-house" materials and correspondence.
3.4	G.4	Communicating personnel evaluations to individuals.
3.4	I.1	Contacts with funding sponsor or monitor of project.
3.2	G.6	Allocating responsibilities to project personnel.
2.8	G	Supervising and coordinating actions of others, and/or of material resources.

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2.6	G.3	Reviewing performance of project personnel.
2.3	G.1	Procurement of project staff.
2.1	H.4	Designing appropriate learning situations.
-2.1	E.2	Computing or using measures of central tendency (i.e., means, medians, modes, arithmetic average).
-2.3	E.7	Examining and interpreting non-quantified information (such as verbal responses, observed activities, etc.).
-2.5	F.	Writing
-2.5	E.3	Computing or using correlation coefficients, including simple correlational analyses.
-2.6	B.3	Developing methodologies to be used in the project.
-2.6	C.3	Developing interview outlines and schedules.
-2.7	A.3	Reading methodological documents presenting information regarding methods of inquiry and/or analysis.
-2.7	E.4	Computing and interpreting simple tests of significance of differences in observed data (such as t-tests).
-2.7	F.5	Writing for professional publications.
-2.8	B.2	Developing conceptual frameworks or general patterns of project design.
-2.9	E.1	Preparing or using frequency tallies and/or marginal distributions (as in Chi-Square tests).
-3.1	E.	Analyzing data.
-3.1	C.1	Constructing questionnaire.
-3.5	C.	Developing research tools or other information-gathering instruments.
-3.7	B.1	Identifying relevant variables for consideration.
-3.8	B.7	Designing system models for computer application to data.
-3.8	F.4	Writing interim, status, or periodic reports.
-4.0	F.3	Writing major project reports.
-5.2	B.5	Designating sampling procedures.
-5.4	B.6	Designating general statistical treatment to be used.

Factor 5: Management Representative (outside contacts)

Characteristics of Personnel with High Positive/Negative Factor Loadings

Factor Loading	Person	Sex	Highest Degree	Relationship to Project	Project Job Role	Project Focus
.90	13-02	M	Mstr	Mgr/Specl	Adv/Consult	Devel
.49	19-02	F	Mstr	Reg Subcontract	Members, prof	Diffus
.40	08-12	M	Dr	Reg. Staff	Manager	Diffus
.33	12-01	M	Dr	Reg. Staff	Prin Inves	Eval
-.32	21-06	M	Dr	Adv/Consult	Manager	Diffus
-.32	09-03	F	Mstr	Reg. Staff	Member, prof	Res
-.34	18-07	F	Mstr	Reg. Staff	Supervisor	Eval
-.46	20-01	M	Dr	Reg. Staff	Prin Inves	Res
-.50	09-01	M	Dr	Reg. Staff	Prin Inves	Res
-.55	09-04	M	Mstr	On-call Staff	Tech Support	Res

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Activity Items Differentiating Personnel With High Positive/Negative Factor Loadings

Scale Difference	Form 04 No.	Label for Activity Statement
5.7	I.2	Contacts with higher agency management for review of project.
5.2	I.1	Contacts with funding sponsor or monitor of project.
4.9	I.3	Presentations made at professional meetings to communicate various aspects of project activities or results.
3.8	I.4	Meeting with visiting personnel from other agencies.
2.2	A.	Reading.
-2.0	B.2	Developing conceptual frameworks or general patterns of project design.
-2.0	D.4	Administering questionnaires.
-2.1	B.3	Developing methodologies to be used in the project.
-2.1	B.6	Designating general statistical treatment to be used.
-2.2	D.2	Surveying literature.
-2.2	D.5	Administering tests.
-2.6	B.5	Designating sampling procedures.
-2.6	E.8	Computing item analyses of test items.
-2.8	C.4	Developing observational techniques.
-2.9	B.1	Identifying relevant variables for consideration.
-2.9	B.4	Organizing a coherent program of activities.
-3.0	B.	Designing or planning procedural activities for the project.
-3.0	C.1	Constructing questionnaires.
-3.2	C.	Developing research tools or other information-gathering instruments.
-3.4	H.4	Designing appropriate learning situations.
-3.8	C.3	Developing interview outlines and schedules.
-4.1	D.1	Interviewing.
-5.0	D.	Collecting project data.

Factor 6: Staff Worker (literature, abstractor)

Characteristics of Personnel with High Positive/Negative Factor Loadings

Factor Loading	Person	Sex	Highest Degree	Relationship to Project	Project Job Role	Project Focus
.80	19-04	F	Mstr	Reg. Staff	Member, prof	Diffus
.78	19-05	F	Bach	Reg. Staff	Member, prof	Diffus
.68	19-06	F	Mstr	Reg. Staff	Member, prof	Diffus
.50	15-04	M	Dr	Reg. Staff	Manager	Devel
.42	21-06	M	Dr	Adv/Consult	Manager	Diffus
.33	07-13	F	Mstr	Reg. Staff	Member, prof	Devel
.32	15-02	M	Mstr	Reg. Staff	Proj Dir	Devel
.30	21-04	F	Mstr	Reg. Staff	Supervisor	Diffus
-.30	17-11	F	Mstr	Reg. Staff	Member, prof	Diffus
-.34	11-04	M	Bach	Reg. Staff	Member, prof	Devel
-.35	18-10	M	Mstr	Reg. Staff	Manager	Eval
-.50	07-03	M	Dr	Reg. Staff	Manager	Devel

APPENDIX 19

(Continued)

Activity Items Differentiating Personnel With High Positive/Negative Factor Loadings

Scale Difference	Form 04 No.	Label for Activity Statement
3.9	A.2	Reading scholarly essays.
3.6	A.	Reading.
2.5	A.4	Reading "in-house" materials and correspondence.
2.4	D.2	Surveying literature.
2.4	G.1	Procurement of project staff.
2.2	A.3	Reading methodological documents presenting information regarding methods of inquiry and/or analysis.
-2.0	E.3	Computing or using correlation coefficients, including simple correlational analyses.
-2.0	B.6	Designating general statistical treatment to be used.
-2.1	B.5	Designating sampling procedures.
-2.2	B.2	Developing conceptual frameworks or general patterns of project design.
-2.2	F.4	Writing interim, status, or periodic reports.
-2.5	C.1	Constructing questionnaires.
-2.6	G.2	Establishing contact with and participation by other personnel or agencies.
-2.9	B.	Designing or planning procedural activities for the project.
-3.0	A.1	Reading recent project-related research.
-3.1	B.3	Developing methodologies to be used in the project.
-3.1	C.	Developing research tools or other information-gathering instruments.
-3.2	B.4	Organizing a coherent program of activities.
-3.8	E.	Analyzing data.
-3.9	B.1	Identifying relevant variables for consideration.

Factor 7: Undefined (possibly "team leader")

Characteristics of Personnel with High Positive/Negative Factor Loadings

Factor Loading	Person	Sex	Highest Degree	Relationship to Project	Project Job Role	Project Focus
.82	19-03	M	Bach	On-call Staff	Staff, prof	Diffus
.60	19-02	F	Mstr	Reg Subcontractor	Staff, prof	Diffus
.51	21-03	M	Mstr	Mgr/Specl	Manager	Diffus
.38	18-09	M	Dr	Reg. Staff	Supervision	Eval
-.36	21-06	M	Dr	Adv/Consult	Manager	Diffus

Activity Items Differentiating Personnel With High Positive/Negative Factor Loadings

Scale Difference	Form 04 No.	Label for Activity Statement
3.8	E.	Analyzing data.

APPENDIX 19

(Continued)

3.5	G.5	Scheduling project activities.
(-2.2 to -3.5)		17 activities unlisted here.
-4.0	B.3	Developing methodologies to be used in the project.
-4.0	B.4	Organizing a coherent program of activities.
-4.0	E.4	Computing and interpreting simple tests of significance of differences in observed data (such as t-tests).
-4.0	E.5	Computing and interpreting data from analysis of variance designs.
-4.0	E.7	Examining and interpreting non-quantified information (such as verbal responses, observed activities, etc.)
-4.2	B.1	Identifying relevant variables for consideration.
-4.5	B.2	Developing conceptual frameworks or general patterns of project design.
-4.5	E.8	Computing item analyses of test items.
-4.5	H.4	Designing appropriate learning situations.
-5.0	A.1	Reading recent project-related research.
-5.2	C.2	Developing test items.
-5.2	C.3	Developing interview outlines and schedules.
-5.2	C.4	Developing observational techniques.
-5.8	A.3	Reading methodological documents presenting information regarding methods of inquiry and/or analysis.
-6.0	D.2	Surveying literature.

Factor 8: Information Disseminator

Characteristics of Personnel with High Positive/Negative Factor Loadings

Factor Loading	Person	Sex	Highest Degree	Relationship to Project	Project Job Role	Project Focus
.36	17-09	M	Mstr	Reg. Staff	Member, prof	Diffus
.31	15-04	M	Dr	Reg. Staff	Manager	Devel
-.37	09-04	M	Mstr	On-Call Staff	Tec Support	Res
-.55	18-12	M	Dr	Mgr/Specl	Member, prof	Eval
-.85	18-02	M	Dr	Reg. Staff	Manager	Eval

Activity Items Differentiating Personnel
With High Positive/Negative Factor Loadings

Scale Difference	Form 04 No.	Label for Activity Statement
5.5	H.1	Participating in classroom instruction.
5.2	H.2	Participating in conduct of seminars or workshops.
4.8	D.1	Interviewing.
4.8	F.5	Writing for professional publications.
4.7	I.3	Presentations made at professional meetings to communicate various aspects of project activities or results.
3.8	A.2	Reading scholarly essays.
3.8	F.1	Writing correspondence.
3.7	H.4	Designing appropriate learning situations.

APPENDIX 19

(Continued)

3.7	I.1	Contacts with funding sponsor or monitor of project.
3.5	D.2	Surveying literature.
3.5	D.3	Conducting laboratory experiments.
3.2	D.	Collecting project data.
3.0	E.7	Examining and interpreting non-quantified information (such as verbal responses, observed activities, etc.).
3.0	I.4	Meeting with visiting personnel from other agencies.
2.8	E.	Analyzing data.
2.8	D.4	Administering questionnaires.
2.5	F.7	Writing literature surveys.
2.5	G.1	Procurement of project staff.
2.3	G.4	Communicating personnel evaluations to individuals.
2.2	G.5	Scheduling project activities.
2.0	A.1	Reading recent project-related research.
2.0	B.2	Developing conceptual frameworks or general patterns of project design.
-2.0	B.7	Designing system models for computer application to data.
-2.2	F.6	Writing administrative reports.
-2.7	C.	Developing research tools or other information-gathering instruments.
-2.7	E.8	Computing item analyses of test items.
-3.0	C.2	Developing test items.
-5.3	C.1	Constructing questionnaires.

Factor 9: Undefined (possibly "research aide")

Characteristics of Personnel with High Positive/Negative Factor Loadings

Factor Loading	Person	Sex	Highest Degree	Relationship to Project	Project Job Role	Project Focus
.50	07-13	F	Mstr	Reg. Staff	Member, prof	Devel
.32	02-07	M	Mstr	Reg. Staff	Member, prof	Devel
-.31	21-08	M	Dr	Mgr/Specl	Proj Dir	Diffus
-.41	21-06	M	Dr	Adv/Consult	Manager	Diffus
-.49	21-03	M	Mstr	Mgr/Specl	Manager	Diffus
-.84	02-02	F	Dr	Reg. Staff	Proj Dir	Devel

Activity Items Differentiating Personnel
With High Positive/Negative Factor Loadings

Scale Difference	Form 04 No.	Label for Activity Statement
4.0	D.	Collecting project data.
3.2	E.	Analyzing data.
2.2	A.4	Reading "in-house" materials and correspondence.
2.0	E.2	Computing or using measures of central tendency (i.e., means, medians, modes, arithmetic average).
2.0	G.2	Establishing contact with and participation by other personnel or agencies.
-2.0	D.3	Conducting laboratory experiments.
-2.0	H.4	Designing appropriate learning situations.

APPENDIX 19

(Continued)

-2.2	A.1	Reading recent project-related research.
-2.2	C.3	Developing interview outlines and schedules.
-2.2	F.7	Writing literature surveys.
-2.2	I.4	Meeting with visiting personnel from other agencies.
-2.5	B.3	Developing methodologies to be used in the project.
-2.5	D.1	Interviewing.
-2.8	B.5	Designating sampling procedures.
-2.8	G.3	Reviewing performance of project personnel.
-3.0	F.6	Writing administrative reports.
-3.0	I.1	Contacts with funding sponsor or monitor of project.
-3.0	I.2	Contacts with higher agency management for review of project.
-3.2	I.	Meeting, consulting, or advising.
-3.5	D.2	Surveying literature.
-3.5	F.2	Writing research proposals.
-3.8	F.4	Writing interim, status, or periodic reports.
-4.2	G.	Supervising and coordinating actions of others, and/or of material resources.
-4.2	F.3	Writing major project reports.
-4.5	G.5	Scheduling project activities.
-4.5	G.6	Allocating responsibilities to project personnel.
-4.8	H.3	Providing on-the-job training to individuals.
-5.0	B.1	Identifying relevant variables for consideration.
-5.0	B.2	Developing conceptual frameworks or general patterns of project design.
-5.8	B.	Designing or planning procedural activities for the project.
-7.0	B.4	Organizing a coherent program of activities.

Factor 10: Undefined (possibly "new doctorate-level employee with statistical skills")

Characteristics of Personnel with High Positive/Negative Factor Loadings

Factor Loading	Person	Sex	Highest Degree	Relationship to Project	Project Job Role	Project Focus
.33	16.04	M	Dr	Reg. Staff	Supervisor	Eval
-.34	10-01	M	Dr	Reg. Staff	Prin Inves	Res
-.82	11-01	M	Dr	Reg. Staff	Prin Inves	Devel

Activity Items Differentiating Personnel
With High Positive/Negative Factor Loadings

Scale Difference	Form 04 No.	Label for Activity Statement
7.0	D.3	Conducting laboratory experiments.
7.0	E.2	Computing or using measures of central tendency (i.e., means, medians, modes, arithmetic average).
7.0	E.4	Computing and interpreting simple tests of significance of differences in observed data (such as t-tests).
7.0	H.4	Designing appropriate learning situations.
6.0	D.	Collecting project data.

APPENDIX 19

(Continued)

6.0	C.1	Constructing questionnaires.
6.0	C.4	Developing observational techniques.
6.0	E.5	Computing and interpreting data from analysis of variance designs.
5.0	C.	Developing research tools or other information-gathering instruments.
5.0	C.2	Developing test items.
5.0	E.3	Computing or using correlation coefficients, including simple correlational analyses.
5.0	E.6	Computing and interpreting regression analyses.
4.0	B.5	Designating sampling procedures.
4.0	D.1	Interviewing.
(3.5 to 2.0)		12 activities unlisted here.
-2.0	E.7	Examining and interpreting non-quantified information (such as verbal responses, observed activities, etc.).
-2.5	B.4	Organizing a coherent program of activities.
-2.5	G.6	Allocating responsibilities to project personnel.
-3.0	F.5	Writing for professional publications.
-3.5	A.2	Reading scholarly essays.
-3.5	F.2	Writing research proposals.
-5.0	F.1	Writing correspondence.
-5.5	G.1	Procurement of project staff.
-5.5	G.3	Reviewing performance of project personnel
-6.0	F.3	Writing major project reports.

APPENDIX 20

Overall Ratings of Various General and Specific Categories of Work Activity and Their Distribution by Percent of Subgroups Rating These Activities as Constituting at least a "Substantial Part" of Their Job

Item Designation	Position Analysis	Overall Rating (N=90)		Project Focus				Degree			Role[a]	
		Mean	SD	Res N=12	Dev N=31	Diff N=26	Eval N=20	Doc N=30	Mas N=38	Bach N=21	High N=41	Medium N=41
	General Categories of Work											
A.	Reading	4.26	1.75	42%	65%	74%	65%	59%	67%	69%	55%	78%
B.	Designing or planning of procedural activities for the project	4.79	2.27	75	73	65	90	83	75	62	92	64
C.	Developing research tools or other information-gathering instruments	3.30	2.42	58	31	36	65	48	43	44	39	54
D.	Collecting data or other systematic gathering of information related to project goals	3.40	2.53	50	48	45	45	34	61	37	37	61
E.	Analyzing data	3.90	2.50	67	50	45	60	62	46	56	47	63
F.	Writing	5.01	1.89	75	85	87	85	90	83	75	95	81
G.	Supervising and coordinating actions of others, and/or of material resources	4.81	2.33	67	73	83	70	90	69	56	95	56
H.	Teaching or training	2.51	2.27	25	15	43	35	31	36	12	29	31
I.	Meeting, consulting, or advising	4.21	2.07	50	62	74	80	79	69	44	76	61

APPENDIX 20

(Continued)

Item Designation	Position Analysis	Overall Rating (N=90)		Project Focus				Degree			Role[a]	
		Mean	SD	Res N=12	Dev N=31	Diff N=26	Eval N=20	Doc N=30	Mas N=38	Bach N=21	High N=41	Medium N=41
	Specific Categories of Work											
A. 1.	Reading recent project-related research	4.02	2.11	50%	48%	58%	68%	69%	53%	43%	58%	59%
2.	Reading scholarly essays	2.66	2.08	33	28	23	26	32	24	24	28	30
3.	Reading methodological documents presenting information regarding methods of inquiry and/or analysis	3.26	2.00	42	26	46	58	48	39	33	45	41
4.	Reading "in-house" materials and correspondence	3.89	2.10	33	55	65	74	66	61	48	65	56
5.	Editing and/or proofing of printed materials	3.70	2.53	0	73	59	33	53	48	62	57	52
B. 1.	Identifying relevant variables for consideration	4.20	2.53	75	42	65	89	86	53	43	82	51
2.	Developing conceptual frameworks or general patterns of project design	4.28	2.68	67	58	58	72	86	57	38	87	42
3.	Developing methodologies to be used in the project	4.19	2.40	58	55	58	79	83	55	43	80	49
4.	Organizing a coherent program of activities	4.26	2.61	75	60	73	74	75	71	57	82	59

APPENDIX 20

(Continued)

Item Designation	Position Analysis	Overall Rating (N=90)		Project Focus				Degree			Role[a]	
		Mean	SD	Res N=12	Dev N=31	Diff N=26	Eval N=20	Doc N=30	Mas N=38	Bach N=21	High N=41	Medium N=41
		Specific Categories of Work (continued)										
5.	Designating sampling procedures	2.73	2.51	58%	29%	38%	42%	55%	34%	24%	42%	37%
6.	Designating general statistical treatment to be used	2.17	2.44	50	13	12	47	36	22	19	31	25
7.	Designing system models for computer application to data	1.21	2.04	33	3	0	21	26	0	10	11	7
8.	Formulating hypotheses or questions to be answered by research	2.67	2.30	50	36	29	47	65	25	12	43	35
9.	Determining constraints to problem solution, such as time, money, personnel, and market factors	2.96	2.30	50	18	36	53	59	36	0	67	19
10.	Developing budgets for tasks or projects	2.52	2.53	0	9	50	40	41	40	12	52	26
11.	Planning and/or making arrangements for field tests, training, trial centers, demonstrations, installations, etc.	2.60	2.14	0	45	27	47	35	44	12	38	33

APPENDIX 20

(Continued)

Item Designation	Position Analysis	Overall Rating (N=90)		Project Focus				Degree			Role[a]	
		Mean	SD	Res N=12	Dev N=31	Diff N=26	Eval N=20	Doc N=30	Mas N=38	Bach N=21	High N=41	Medium N=41
	Specific Categories of Work (continued)											
12.	Planning of behavioral, attitudinal, and/or learning change in some target group	2.66	2.55	0%	45%	41%	33%	53%	32%	25%	52%	30%
C. 1.	Constructing questionnaires	2.59	2.54	42	30	20	63	43	35	29	28	45
2.	Developing test items	2.46	2.67	33	33	28	42	43	24	38	31	42
3.	Developing interview outlines and schedules	2.30	2.42	42	20	24	47	39	27	24	36	27
4.	Developing observational techniques	2.34	2.41	42	23	36	37	43	32	19	31	35
5.	Identifying appropriate measures for events, variables, or other measurement concerns	2.59	2.60	50	9	29	60	53	29	12	29	42
6.	Fabricating of physical items, such as response recorders, stimulus presentation devices, room partitions or furniture, prototype devices, etc.	1.00	2.07	0	9	19	7	12	12	12	10	15

APPENDIX 20

(Continued)

Item Designation	Position Analysis	Overall Rating (N=90)		Project Focus				Degree			Role[a]	
		Mean	SD	Res N=12	Dev N=31	Diff N=26	Eval N=20	Doc N=30	Mas N=38	Bach N=21	High N=41	Medium N=41
Specific Categories of Work (continued)												
D. 1.	Interviewing	2.53	2.36	42%	27%	40%	26%	36%	38%	19%	31%	35%
2.	Surveying literature	3.13	2.46	33	43	52	47	54	46	33	54	42
3.	Conducting laboratory experiments	1.33	2.17	17	13	24	6	18	14	15	8	21
4.	Administering questionnaires	1.60	2.13	25	20	20	21	21	24	14	15	22
5.	Administering tests	1.36	2.17	17	17	20	6	14	16	15	8	21
6.	Performing aspects of job and/or task analysis	2.18	2.41	0	18	38	27	24	29	37	33	27
7.	Deriving or otherwise verifying the merit and/or relevance of student performance objectives (behavioral objectives)	2.90	2.76	0	64	36	27	41	44	12	48	33
8.	Collecting and organizing information relevant to preparation of a public information, dissemination, product distribution, or marketing plan	2.94	2.60	0	55	50	47	53	56	12	62	41
E. 1.	Preparing or using frequency tallies and/or marginal distributions (as in Chi-Square tests)	1.84	2.38	25	10	16	42	21	16	29	13	30

APPENDIX 20

(Continued)

Item Designation	Position Analysis	Overall Rating (N=90)		Project Focus				Degree			Role[a]	
		Mean	SD	Res N=12	Dev N=31	Diff N=26	Eval N=20	Doc N=30	Mas N=38	Bach N=21	High N=41	Medium N=41
	Specific Categories of Work (continued)											
2.	Computing or using frequency of central tendency (i. e., means, medians, modes, arithmetic average)	2.07	2.48	42%	13%	12%	58%	32%	22%	29%	18%	37%
3.	Computing or using correlation coefficients, including simple correlational analyses	1.77	2.31	33	13	8	53	36	14	24	21	27
4.	Computing and interpreting simple tests of significance of differences in observed data (such as t-tests)	1.91	2.55	33	3	28	53	39	16	24	26	27
5.	Computing and interpreting data from analysis of variance designs	1.74	2.46	42	7	20	33	33	14	19	16	27
6.	Computing and interpreting regression analyses	1.22	1.93	36	7	4	26	26	3	19	11	17
7.	Examining and interpreting non-quantified information (such as verbal responses, observed activities, etc.)	2.93	2.51	25	43	36	42	54	24	43	38	37

APPENDIX 20

(Continued)

Item Designation	Position Analysis	Overall Rating (N=90)		Project Focus				Degree			Role[a]	
		Mean	SD	Res N=12	Dev N=31	Diff N=26	Eval N=20	Doc N=30	Mas N=38	Bach N=21	High N=41	Medium N=41
	Specific Categories of Work (continued)											
8.	Computing item analyses of test items	1.44	2.05	18%	18%	8%	11%	12%	6%	29%	6%	20%
9.	Drawing implications from the results of prior research (interpret, evaluate, and synthesize the relevant literature)	3.06	1.98	0	45	48	47	59	33	50	57	38
10.	Analyzing the nature of various audiences or "publics" to prepare appropriate communications	2.44	2.51	0	44	27	47	53	22	37	47	30
F. 1.	Writing correspondence	3.25	2.31	33	40	58	42	50	42	43	56	39
2.	Writing research proposals	1.94	2.37	33	7	28	37	50	11	10	36	15
3.	Writing major project reports	3.54	2.68	67	37	69	63	71	55	38	69	49
4.	Writing interim, status, or periodic reports	3.84	2.20	67	37	77	68	79	58	38	69	56
5.	Writing for professional publications	1.90	2.28	58	23	16	21	50	16	10	41	15
6.	Writing administrative reports	2.56	2.51	42	13	58	32	36	39	24	46	27

APPENDIX 20

(Continued)

Item Designation	Position Analysis	Overall Rating (N=90)		Project Focus				Degree			Role^a	
		Mean	SD	Res N=12	Dev N=31	Diff N=26	Eval N=20	Doc N=30	Mas N=38	Bach N=21	High N=41	Medium N=41
	Specific Categories of Work (continued)											
7.	Writing literature surveys	1.26	1.77	17%	10%	12%	11%	21%	5%	10%	18%	7%
8.	Writing of computer programs for data handling of analysis	.47	1.44	0	0	5	7	0	0	25	0	8
9.	Writing of programmed instruction outlines and/or frames	.92	1.93	0	0	19	0	0	8	25	0	15
10.	Writing of detailed lesson plans	.96	2.18	0	9	19	0	6	12	12	5	15
G. 1.	Procurement of project staff	2.44	2.57	33	29	31	32	48	26	14	52	10
2.	Establishing contact with and participation by other personnel or agencies	3.51	2.50	42	60	50	53	61	47	52	62	44
3.	Reviewing performance of project personnel	3.13	2.60	50	39	54	42	69	39	24	67	22
4.	Communicating personnel evaluations to individual	2.52	2.42	33	27	46	32	43	32	29	44	27
5.	Scheduling of project activities	4.07	2.45	58	58	69	68	66	66	57	77	54

APPENDIX 20

(Continued)

Item Designation	Project Analysis	Overall Rating (N=90)		Project Focus				Degree			Role[a]	
		Mean	SD	Res N=12	Dev N=31	Diff N=26	Eval N=20	Doc N=30	Mas N=38	Bach N=21	High N=41	Medium N=41
	Specific Categories of Work (continued)											
6.	Allocating of responsibilities to project personnel	3.56	2.54	67	35	69	58	72	47	43	77	32
H. 1.	Participating in classroom instruction	1.05	1.92	8	10	20	11	11	19	5	13	15
2.	Participating in conduct of seminars or workshops	1.95	2.11	17	23	27	11	21	26	10	26	17
3.	Providing on-the-job training to individuals	2.70	2.20	42	19	46	47	55	34	14	45	29
4.	Designing appropriate learning situations	2.03	2.51	25	30	28	32	29	41	9	36	22
5.	Conducting demonstrations of development products before various groups, and answering questions asked by members of the group	1.86	2.00	0	27	27	13	24	20	25	19	26
6.	Preparing visual materials, such as films, slides, video tapes, visual teaching aids, etc.	1.58	2.23	0	20	24	7	12	13	37	5	27

APPENDIX 20

(Continued)

Item Designation	Project Analysis	Overall Rating (N=90)		Project Focus				Degree			Role[a]	
		Mean	SD	Res N=12	Dev N=31	Diff N=26	Eval N=20	Doc N=30	Mas N=38	Bach N=21	High N=41	Medium N=41
Specific Categories of Work (continued)												
I. 1.	Contacts with funding sponsor or monitor of project	2.56	2.24	17	37	31	32	39	34	14	51	10
2.	Contacts with higher agency management for review of project	2.67	2.50	18	17	50	53	44	34	24	42	27
3.	Presentations made at professional meetings to communicate various aspects of project activities or results	2.29	2.22	25	26	35	27	34	32	10	35	20
4.	Meeting with visiting personnel from other agencies	2.77	2.01	33	27	46	37	46	32	29	38	32
5.	Conferring with colleqgues, staff, and/or students	4.78	1.82	50	82	68	93	82	80	62	76	81
6.	Interacting directly with personnel of other agencies, such as for field tests, at trial learning centers, potential users users of R & D products, etc.	2.76	2.10	0	72	36	47	47	48	37	62	33

APPENDIX 20

(Continued)

Item Designation	Position Analysis	Overall Rating (N=90)		Project Focus				Degree			Role[a]	
		Mean	SD	Res N=12	Dev N=31	Diff N=26	Eval N=20	Doc N=30	Mas N=38	Bach N=21	High N=41	Medium N=41
		Specific Categories of Work (continued)										
7.	Speaking before public groups or specific target audiences	2.20	2.07	0	27	33	13	29	25	12	29	23

Note. -Data presented is based on ratings of each category of activity according to an eight-point scale where:
0 = Definitely not a part of my work;
4 = A substantial part of my work;
7 = A most significant part of my work; and where
N = The number of such ratings available for the calculations within each column of the table.

[a] Role subgroups are defined as: High = Top managers, directors; Medium = Intermediate managers, supervisors (as ranked by the respondents); data insufficient to include Low = Staff workers (N=7).

A GUIDE TO THE OREGON STUDIES IN EDUCATIONAL RDD&E

Volume I

SUMMARY REPORT

An introduction to and overview of the Oregon Studies as a whole. The volume contains an outline of the history of the Studies, the rationale around which they were designed, the context within which they were carried out, and the procedures followed in their execution. It also contains a description of the projects selected for study, the rationale underlying their selection, the criteria and procedures used in their selection, and an overview of the data collected on each project. Finally, the volume contains an introduction to the "case profiles" that house the data collected on each project, the results of all cross-project analyses, and the summary recommendations that have been made relative to training and the continued study of educational RDD&E activities. A brief description of the case study methodology developed within the Studies, an overview of a process whereby investigators may query computer-stored data files and original interview statements to obtain information bearing upon specific questions relating to training, manpower, policy, and work performance, and supporting data accompany the volume.

Volume II

THE LITERATURE OF EDUCATIONAL RDD&E

A compendium of existing literature that defines, describes, differentiates, or relates the activities labeled educational research, development, diffusion, evaluation, and various combinations thereof. The articles within the volume are introduced as a collection. Linking passages provide an interpretive context both for individual articles and for the sets into which they have been grouped.

Volume III

CONCEPTUAL FRAMEWORKS FOR VIEWING EDUCATIONAL RDD&E

A collection of papers which provide the conceptual underpinnings to the Oregon Studies. It contains three papers commissioned by the Studies as a basis for conceptual development, and a paper by staff from Teaching Research that describes the conceptual frame that guided and grew with the empirical thrust of the Studies. Each of the papers is a major document which defines, differentiates, and relates one or more facets of educational RDD&E and provides a supporting rationale for the position adopted. Each paper is accompanied by a formal critique, and the set of papers is accompanied by an introductory and summary critique.

Volume IV

PROFILES OF EXEMPLARY PROJECTS IN EDUCATIONAL RDD&E

A collection of twenty case profiles that form the data base in the Oregon Studies. Printed in three parts, the profiles describe five research projects, seven development projects, three evaluation projects, and five diffusion projects. Each profile contains descriptions of the structure and function of the project being analyzed, the specific outputs expected to emerge from it, the operations required to produce each output, and the knowledges, skills, and sensitivities judged to be essential to the performance of those operations. In addition, each profile contains sections dealing with the "dynamics" of project operations and implications that derive from the project for preservice staff training. The projects described range from small, two-man efforts within university settings to very large school district "projects" employing several dozen staff members. Eighteen of the twenty projects described were judged to be illustrative of the kinds of RDD&E activities likely to occur within the context of education in the future. The twenty projects account for analyses around 298 project outputs and interviews with 134 professional staff members.

Volume V

A METHODOLOGY FOR THE STUDY OF EDUCATIONAL RDD&E

A detailed description of the most refined form of the data collection methodology developed within the Studies, directions to guide its use, and the decision rules needed for the volume to function as a users manual. The volume includes information on procedures used in site contact, site preparation, data reduction and analysis, and profile preparation. It also includes information on the category sets used in data reduction and the computerized data files that contain or provide access to all data collected in the Studies.

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